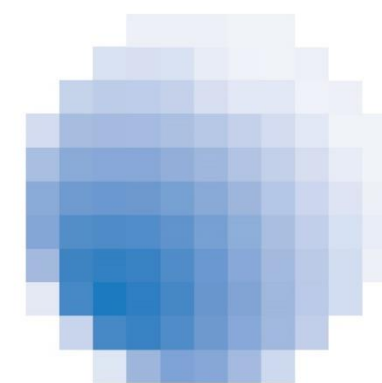




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Star Radcliffe Academy

Radcliffe, Manchester

Environmental & Intrusive Noise Study (Planning)

FS1013-SOL-ZZ-ZZ-D-J-0002 P04

29 August 2023

PROJECT: Star Radcliffe Academy  
Radcliffe, Manchester  
Environmental & Intrusive Noise Study  
(Planning)

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REFERENCE: FS1013-SOL-ZZ-ZZ-D-J-0002 P04

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DATE: 29 August 2023

## EXECUTIVE SUMMARY

Sol Acoustics Ltd (“Sol”) has been appointed by Morgan Sindall PLC to undertake an environmental and intrusive noise study to support the Planning Application for the proposed new Star Radcliffe Academy, which is to be located on Spring Lane in Radcliffe Manchester M26 2SZ (hereinafter referred to as the “Academy”).

The purpose of this report is to assess the scheme in terms of intrusive noise, and to determine an appropriate acoustic performance specification for the building envelope, all as based on the pre-existing environmental noise climate on site as conducted in May 2023, the intrusive noise requirements of Building Bulletin 93 and currently available architectural design drawings at the time of the report, August 2023.

This report demonstrates that BB93 indoor ambient noise limits can be achieved within all noise sensitive spaces using the proposed ventilation strategy and the proposed double glazing.

Additionally, appropriate M&E plant daytime and night time environmental noise limits have been set herein, as based on the environmental noise survey undertaken.

With regards to the recommendations made within this report, others must advise in matters of Fire Engineering, SAP calculations/overheating, ventilation requirements, wind noise and aesthetics.

The report also considers the potential noise impact from the proposed outdoor amenities on nearby noise sensitive premises.

*Please refer to the main report and appendices for further information.*



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## 1 INTRODUCTION

Sol Acoustics Ltd (“Sol”) has been appointed by Morgan Sindall PLC to undertake an environmental and intrusive noise study to support the Planning Application for the proposed new Star Radcliffe Academy, which is to be located on Spring Lane in Radcliffe Manchester M26 2SZ (hereinafter referred to as the “Academy”). The purpose of this report is as follows:

- To identify the location of the nearest pre-existing noise sensitive receptors to the site, which are most likely to be affected by environmental noise arising from plant and/or processes associated with the development.
- To determine the prevailing background noise climate at the nearest noise sensitive receptors.
- To determine maximum permissible noise level limits which are required to be achieved by all proposed externally mounted building services equipment associated with the development.
- To determine the typical ambient noise levels expected at the location of the proposed development and associated outdoor teaching and recreational areas.
- To provide outline acoustic design recommendations for the proposed new development with regards to the ventilation strategy and key elements of the proposed external façade.
- To assess the potential noise impact from the proposed outdoor amenities on nearby noise sensitive premises.

This acoustic report is structured as follows:

- Section 2 provides a basic description of the proposed Academy and the surrounding noise sensitive receptors.
- Section 3 provides a summary of the relevant acoustic design standards and guidance documents which have been used to inform this assessment.
- Section 4 provides information regarding the benchmark environmental noise survey which shall be undertaken in order to determine the pre-existing environmental noise climate at the identified NSRs and also at the location of the proposed Academy itself.
- Section 5 provides a basic summary of the proprietary 3D acoustic models constructed and acoustic calculations undertaken.
- Section 6 provides an intrusive noise assessment of the proposed Academy and specifies appropriate acoustic measures as required to achieve appropriate indoor ambient noise levels.

- Section 7 sets appropriate noise level limits for all proposed building services equipment.
- Section 8 provides a noise impact assessment from the proposed new outdoor play areas or multi-use games areas (“MUGA”).
- *Appendix A provides a glossary of acoustic terminology.*
- *Appendix B provides details of the noise surveys undertaken and a summary of the data obtained from them.*
- *Appendix C gives details and qualifications of contributing Sol staff.*

## **2 DESCRIPTION OF SITE**

### **2.1 General Overview of the Site and Surroundings**

The proposed Academy is to be located on Spring Lane, in a predominantly residential area. The existing Radcliffe Leisure Centre and Spring Lane school are currently located on the site.

The Radcliffe to Bury Metrolink line is located just east of the Academy site.

The nearest residential housing to the site are as follows:

- Housing located on Shirebrook Drive, which is located c.40 metres distance to the south west;
- Housing located on Bury Road, which is located c.40 metres distance to the east.

An aerial photograph of the Academy site and its immediate surroundings is provided in Figure 1.

### **2.2 Development Proposals**

The proposed Academy comprises of the following key elements:

- Classrooms and teaching spaces
- SEN accommodation
- Music classrooms
- Sports hall and activity studio
- Office staffrooms
- Dining
- Kitchens
- Wash rooms, changing rooms and lockers
- WCs
- Plantrooms

The proposed site plan for the Academy is shown in Figure 2.

The Academy will include six new outdoor play areas or multi-use games areas (“MUGAs”). Noise from the use of the new sports pitches has the potential to affect the nearby existing residential premises. The locations of the new MUGAs are shown in Figure 1 and an assessment of the potential noise level impact as associated with the new MUGAs is provided in report Section 8.

A new site access road is also proposed to the south of the site. The access road is primarily expected to be used by cars as during the start and end of the school day only. As such, the potential noise level impact associated with the new access road is not considered to be acoustically significant and is not assessed further as part of this environmental and intrusive noise study.

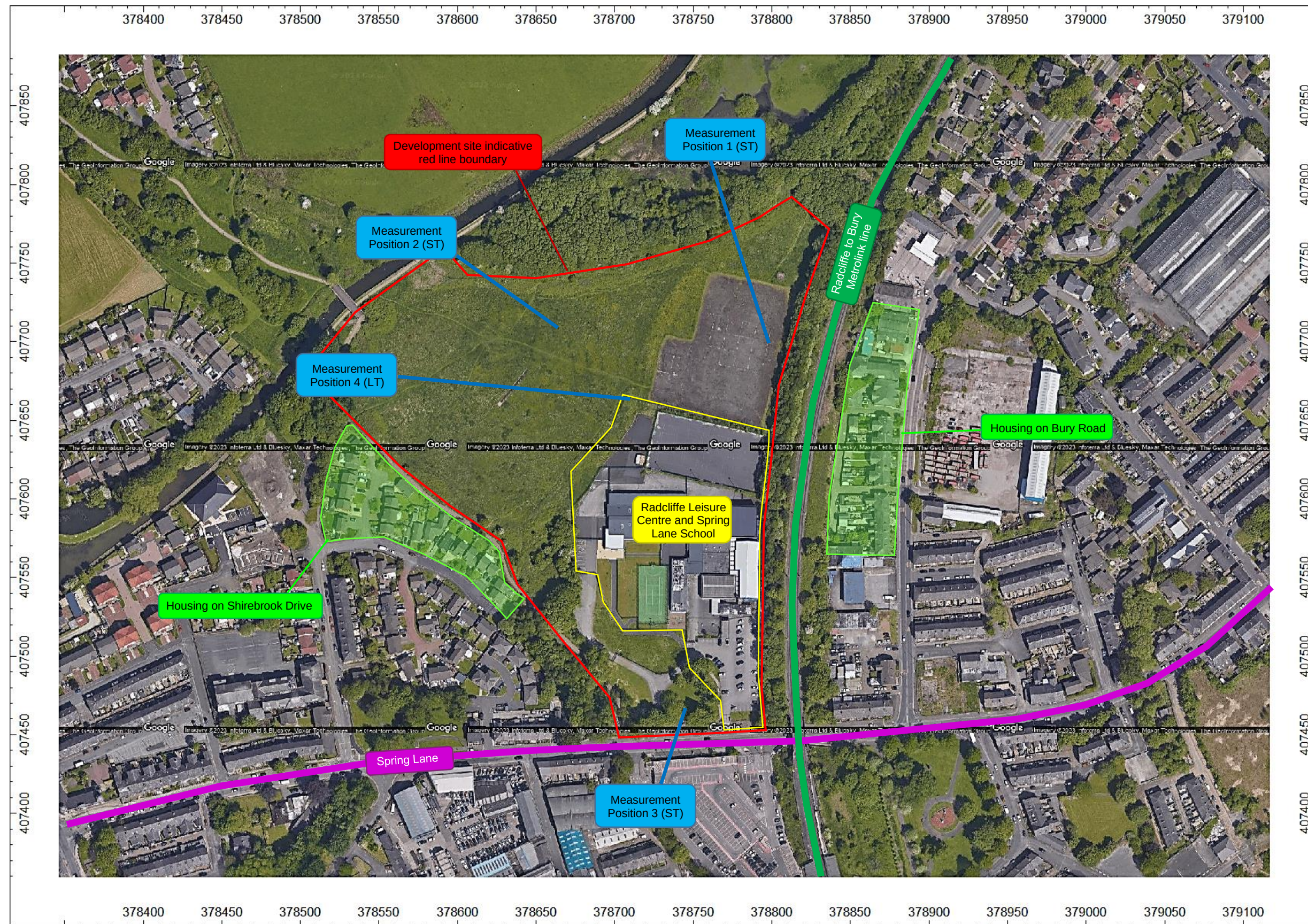


Figure 1: Aerial photography of the proposed Academy, measurement locations and surrounding areas/receptors (Google Earth 2023)



Figure 2: Proposed site plan

### 3 ACOUSTIC DESIGN CRITERIA

#### 3.1 Employer's Requirements (ERs)

Sol is not aware of any specific Employer's Requirements (ERs) relating to the acoustic design of the proposed Academy that deviate from generic and mandatory acoustic guidance as set out and presented within Building Bulletin 93 (see report Section 3.2).

#### 3.2 Building Bulletin 93

Issued by the Department for Education (DfE) in February 2015, Building Bulletin 93 '*The Acoustic Design of Schools*' ("BB93") sets out acoustic performance standards to be achieved in a learning and teaching environment. It applies to both new-build and refurbished developments. For learning and teaching spaces as located within a secondary school educational establishment, compliance with this Standard is mandated under Requirement E4 of Part E the Building Regulations 2010 ("ADE"), which states:

*'... Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use ...'*

ADE in support of the Building Regulations gives the following guidance:

*'... In the Secretary of State's view the normal way of satisfying Requirement E4 will be to meet the values for sound insulation, reverberation time and internal ambient noise which are given in section 1 of Building Bulletin 93 'The Acoustic Design of Schools', produced by DfES ...'*

(Note: Department for Education and Skills (DfES) is now DfE).

Specifically, BB93 provides design targets for the following acoustic considerations:

- Indoor ambient noise levels
- Sound insulation between internal spaces (airborne and impact sound transmission)
- Reverberation times in key spaces and sound absorption in corridors and stairwells
- Speech intelligibility within open plan spaces; and
- Indoor ambient noise levels generated during rainfall

##### 3.2.1 Acoustics of Schools: a design guide

'*Acoustics of Schools: a design guide*' ("AOS") as published jointly by the Institute of Acoustics and the Association of Noise Consultants in November 2015, provides guidance and recommendations for the acoustic design of new and refurbished schools.

Whilst the main aim of this document is to provide generic acoustic design recommendations in order to be capable of achieving compliance with the acoustic performance standards set out in BB93, the AOS does specify appropriate acoustic design standards for areas of a school premises which are not enforced under Requirement E4 of the Building Regulations, and as such are not specified in BB93. In particular, the AOS sets out appropriate guidance for suitable ambient noise levels to be achieved within outdoor teaching and recreational areas.

##### 3.2.2 Alternative Performance Standards (APS)

BB93 recognises that alternative acoustic performance standards may be appropriate in some instances. Any Alternative Performance Standard ("APS") proposed should ideally be an improvement to the BB93 performance standard, but lower performances can also be proposed, providing that they can be justified. Usually, all proposed APS must be justified on the grounds of educational, environmental and/or health and safety, but it may be possible to agree an APS on other grounds such as costs - providing that the Building Control Officer (where applicable) and the Client understand and formally accept the reasons behind the change.

BB93 advises that APS should not normally be of a lower standard than those shown for refurbishment projects, or the specifically defined exceptions listed in the document (Section 1.2.3 of BB93 for example). Where the performance standard for refurbishment is proposed as an APS for a new school, a full and proper case must be made and documented so as to justify the decision.

### 3.3 BS4142: 2014+A1: 2019

BS 4142: 2014+A1: 2019: *'Method for rating and assessing industrial and commercial sound'* is intended to be used to assess noise of an industrial nature, which includes sound from fixed installations comprising of mechanical and/or electrical plant and equipment. The methods prescribed in this British Standard use outdoor sound levels in order to assess the likely effects of sound on people who might be inside or outside a dwelling or premises that is used for residential purposes upon which sound is incident.

The procedure contained in BS 4142: 2014+A1: 2019 for assessing environmental noise impact is to compare the measured or predicted noise level from the source in question - the "Specific Sound Level" immediately outside the noise sensitive premises - with the corresponding "Background Sound Level". Where the noise contains attention attracting characteristics such as tonal, impulsive and/or intermittent elements, it may be appropriate to apply a correction to the Specific Sound Level in order to obtain the "Rating Level."

BS 4142: 2014+A1: 2019 states that the significance of sound arising from an industrial and/or commercial nature depends upon both the margin by which the Rating Level of the "Specific Sound Source" exceeds the Background Sound Level, and also the context in which the sound occurs:

- a) Typically, the greater this difference, the greater the magnitude of the impact
- b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context
- c) A difference of around +5dB 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

For the daytime, the assessment is conducted over a one-hour period, and over a 15-minute period at night. The daytime and night time periods are defined as occurring between 07:00 hours to 23:00 hours, and 23:00 hours to 07:00 hours, respectively.

### 3.4 BS8233: 2014

BS 8233:2014: *'Guidance on sound insulation and noise reduction for buildings'* provides guidance for the control of noise in and around buildings. The guidance provided within the Standard is applicable to the design of new buildings or refurbished buildings undergoing a change of use, but it does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.

The guidance provided includes appropriate internal and external noise level criteria that are applicable to dwellings for steady external noise sources

With respect to external amenity spaces such as gardens and patios, the guidance states that it is desirable that the noise level does not exceed 50dB  $L_{Aeq,T}$  at these locations, with a corresponding upper guideline value of 55dB  $L_{Aeq,T}$  which would be acceptable in noisier environments. The guidance further advises that higher external noise criteria may be appropriate under certain circumstances such as within city centres urban areas, and locations adjoining the strategic network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource. In these cases, the development should be designed to achieve the lowest practicable levels in external amenity spaces but should not be prohibited on these grounds alone.

### 3.5 WHO Guidelines for Community Noise

The World Health Organisation ("WHO") Guidelines for Community noise was originally issued in April 1999 and is based upon scientific knowledge/research of the health effects associated with noise: These guidelines have been published in the document 'Guidelines for Community Noise' with a view to providing guidance to environmental health authorities and professionals trying to protect people from the effects of noise in non-industrial environments. Table 1 sets out the WHO guidance for the onset of annoyance from community noise within outdoor living spaces:

| Location            | Effect                         | Ambient Sound Level, dB $L_{Aeq,T}$ |
|---------------------|--------------------------------|-------------------------------------|
| Outdoor Living Area | Onset of moderate annoyance    | 50                                  |
|                     | Onset of significant annoyance | 55                                  |

**Table 1:** World Health Organisation criteria for outdoor living spaces



3.6 IEMA Guidelines for Environmental Noise Impact Assessment (Version 1.2, November 2014)

The Institute of Environmental Management & Assessment (“IEMA”) sets out key principles of noise impact assessment that are applicable to all development proposals where noise effects are likely to occur. These guidelines provide specific support on how noise impact assessment fits within the Environmental Impact Assessment.

Table 7-14 of the IEMA Guidance provides guidance for assessing the potential noise impact as due to the change in sound levels. Table 2 below sets out the appropriate assessment criteria for a short-term impact classification:

| Short Term Impact Classification | Sound Level Change dB $L_{Aeq,T}$ (Positive or Negative),<br>T = either 16-hour Day or 8-hour Night |
|----------------------------------|-----------------------------------------------------------------------------------------------------|
| Negligible                       | $\geq 0\text{dB}$ and $< 1\text{dB}$                                                                |
| Minor                            | $\geq 1\text{dB}$ and $< 3\text{dB}$                                                                |
| Moderate                         | $\geq 3\text{dB}$ and $< 5\text{dB}$                                                                |
| Major                            | $\geq 5\text{dB}$                                                                                   |

Table 2: Impact from the change in sound level (short-term only)



4 ENVIRONMENTAL NOISE SURVEY

4.1 Sol Environmental Noise Survey

An environmental noise survey was conducted by Sol between 7 June and 8 June 2023.

The survey consisted of three short term and one long term measurement positions as shown in Figure 1, and as described in Table 3:

| Measurement Position |     | Description                                                                                                                                                                                                         |
|----------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Short term           | MP1 | Tripod-mounted microphone sited in free field conditions, at a height of c.1.5 metres above ground level near the eastern site boundary. The microphone was approximately 30 metres distance from the railway line. |
|                      | MP2 | Tripod-mounted microphone sited in free field conditions, at a height of c.1.5 metres above ground level near the northwest site boundary.                                                                          |
|                      | MP3 | Tripod-mounted microphone sited in free field conditions, at a height of c.1.5 metres above ground level near Spring Lane to the south of the site.                                                                 |
| Long term            | MP4 | Mast-mounted microphone sited in free field conditions, at a height of c.3 metres above ground level near the centre of the site.                                                                                   |

Table 3: Noise monitoring measurement positions summary

Type 1 Precision Grade sound measuring instrumentation was exclusively used and a microphone windshield was used in all cases. Full details of all the instrumentation used, and corresponding traceable calibration records, are retained on file by Sol and available for inspection if required.

Meteorological data was recorded for the duration of the noise survey, as using a Professional Grade Vaisala “WXT530” weather station. Weather conditions remained favourable for the duration of the survey.

Notwithstanding the weather conditions recorded, the microphone systems were entirely weatherproofed and fitted with all-weather environmental windshields, each with a bird spike.

Appendix B provides further details of the survey methodology and recorded weather conditions.

4.2 Environmental Noise Survey Results

Table 2 provides a basic summary of the average, free field environmental noise levels measured at the short term positions MP1, MP2 and MP3:

| Measurement Location | Start Time (hh:mm) | Measured Noise Level |               |               |
|----------------------|--------------------|----------------------|---------------|---------------|
|                      |                    | dB LA1,30min         | dB LAeq,30min | dB LA90,15min |
| MP1                  | 07/06/2023 11:32   | 63                   | 50            | 41            |
| MP2                  | 07/06/2023 12:07   | 57                   | 48            | 44            |
| MP3                  | 07/06/2023 12:50   | 67                   | 62            | 52            |

Table 4: Summary of typical, measured broadband environmental noise levels at short term positions

Table 5 provides a basic summary of the average, free field environmental noise levels measured at the long term position MP4:

| Measurement Position                                       | Date                  | Daytime (07:00 – 23:00 Hours) |                         | Night Time (23:00 – 07:00 Hours) |                         |
|------------------------------------------------------------|-----------------------|-------------------------------|-------------------------|----------------------------------|-------------------------|
|                                                            |                       | dB LAeq,T                     | dB LA90,15min (Typical) | dB LAeq,T                        | dB LA90,15min (Typical) |
| MP4                                                        | Wednesday 7 June 2023 | 49*                           | 45                      | 44                               | 37                      |
|                                                            | Thursday 8 June 2023  | 49*                           | 46                      | -                                | -                       |
| * Measurement not conducted for the full assessment period |                       |                               |                         |                                  |                         |

Table 5: Summary of typical, measured broadband environmental noise levels at long term position

## 5 ENVIRONMENTAL NOISE MODEL

In order to predict the likely noise levels impinging on the surrounding noise sensitive receptors from the Academy, proprietary 3D computer noise models were created using the DataKustik “CadnaA” Noise Mapping software. The following assumptions have been made when building all the noise models:

- (a) The noise model was set up to apply the noise prediction methodology set out in ISO 9613-2: ‘Acoustics – Attenuation of Sound propagation outdoors – Part 2: General Method of Calculation’.
- (b) The model was set to include second order reflected noise from solid structures.
- (c) The base ground absorption for the model has been set to  $G=1.0$  (predominantly soft ground).
- (d) Noise from nearby road traffic and the Metrolink line have been determined based upon the results of the on-site environmental noise level measurements.

Figure 3 provides a three-dimensional visualisation of the noise model used to inform the noise impact assessment. *The location of all modelled noise sources is shown in Appendix C.*



**Figure 3:** 3D view of the noise model for the proposed Academy

## 6 INTRUSIVE NOISE ASSESSMENT

### 6.1 Acoustic Design Targets

The required degree of sound insulation to be provided by the external building fabric is determined as based upon the predicted environmental noise levels expected to be incident on the façades of the Academy, and the indoor ambient noise level requirements of the occupied spaces adjoining the external building envelope. Table 6 provides the indoor ambient noise level (IANL) requirements to be achieved in each type of space proposed within the Academy:

| Space                                                                                                                                                 | Indoor Ambient Noise Level Requirement, dB $L_{Aeq,30min}$ |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Ground Floor                                                                                                                                          |                                                            |
| Teaching spaces intended specifically for students with special hearing and communication needs                                                       | 30                                                         |
| SEN group rooms, SEN resource space                                                                                                                   | 30/35*                                                     |
| Assembly hall, music classroom, music practice room                                                                                                   | 35                                                         |
| Library (LRC), DT studios, ICT studios, activity studio, sports hall, medical rooms, meeting rooms                                                    | 40                                                         |
| Reception, offices, meeting rooms                                                                                                                     | 40**                                                       |
| Dining room, corridors, and stairwell                                                                                                                 | 45                                                         |
| Kitchen, changing rooms, toilets                                                                                                                      | 50**                                                       |
| Storerooms, plantrooms                                                                                                                                | n/a                                                        |
| First Floor                                                                                                                                           |                                                            |
| Classrooms                                                                                                                                            | 35                                                         |
| Art, Food Room, ICT classrooms                                                                                                                        | 40                                                         |
| Offices                                                                                                                                               | 40**                                                       |
| Corridors and stairwell                                                                                                                               | 45                                                         |
| Toilets                                                                                                                                               | 50                                                         |
| Storerooms, plantrooms                                                                                                                                | n/a                                                        |
| Second Floor                                                                                                                                          |                                                            |
| Classrooms                                                                                                                                            | 35                                                         |
| Science laboratories, ICT classroom                                                                                                                   | 40                                                         |
| Offices, staffrooms, kitchenette                                                                                                                      | 40**                                                       |
| Corridors and stairwell                                                                                                                               | 45                                                         |
| Toilets                                                                                                                                               | 50                                                         |
| Storerooms, plantrooms                                                                                                                                | n/a                                                        |
| * Lower requirement of 30dB $L_{Aeq,30min}$ only applies if rooms are intended specifically for students with special hearing and communication needs |                                                            |
| ** Exempt From ADE requirements, recommended performance only.                                                                                        |                                                            |

**Table 6:** Indoor ambient noise level requirements

BB93 allows for various relaxations which can be applied to the IANL design target depending upon the ventilation solution adopted and the required ventilation rate. The various ventilation conditions are defined as follows:

- **Normal:** The normal condition for a ventilation system with purely mechanical air supply is defined as when the system is operating to limit the daily average carbon dioxide concentration to no more than 1,000ppm, with the maximum concentration not exceeding 1,500ppm for more than 20 consecutive minutes on any day during normal school operating hours. This would normally equate to a minimum ventilation rate of approximately 8l/s per person.
- **Summertime:** Ventilation under local control of teacher to prevent overheating – allowable during the hottest 200 hours of the year.
- **Intermittent boost:** Ventilation under local control of teacher for dilution of fumes during practical activities as in practical spaces for science, art, food technology and design and technology.

Under “normal” ventilation conditions, BB93 allows for a +5dB relaxation to be applied to the IANL design standard, as presented in Table 6 for the spaces proposed within this Academy for all rooms which are:

- Naturally ventilated; or
- Ventilated using a hybrid (mechanically assisted natural ventilation) solution. In this case, the noise level from the mechanical system alone should not exceed the specified IANL target (i.e. the +5dB relaxation only applies to the natural ventilation component and not the mechanical ventilation component).

The above cannot be applied to teaching and learning spaces with an IANL target (excluding the +5dB relaxation) greater or equal to 45dB  $L_{Aeq,30min}$ .

In addition to the above, the following relaxations can be applied to the Indoor Ambient Noise Level during “Summertime” or “Intermittent boost” ventilation conditions:

- IANL target of 55dB  $L_{Aeq,30min}$  or lower for rooms where the required ventilation rate is provided by natural means.
- BB93 IANL target + 5dB  $L_{Aeq,30min}$  or lower for rooms where the required ventilation rate is provided by a mechanical system. This relaxation cannot be applied to teaching and learning spaces with an IANL target greater or equal to 45dB  $L_{Aeq,30min}$ .

It should be noted that the above relaxations do not apply to any spaces intended specifically for students with special hearing and communication needs.

In addition, relaxations can be applied to the Indoor Ambient Noise Level for rooms with local process extract systems, i.e. such as odour extracts, fume cupboards etc. The relaxation will depend upon the specific requirements of the process extract system.

The above noise limits include the noise contributions from all external environmental noise sources, in addition to noise from building services plant associated with the Academy itself.

## 6.2 Predicted Environmental Noise Levels

The results of the environmental noise survey and 3D noise model have been used to predict the environmental noise levels on each façade of the Development.

Figure 4 shows the predicted daytime environmental noise levels on each façade of the Academy.



**Figure 4** Predicted daytime free-field ambient noise levels on the façades of the Academy, dB  $L_{Aeq,30min}$

### 6.3 External Façade

Details of the proposed external façade construction are not known to Sol at this stage, as at the time of reporting (August 2023).

### 6.4 External Glazing and Cladding

Standard thermal insulating glazing (e.g. 4mm / 10mm / 4mm double glazing) would provide suitable protection from environmental noise intrusion for all spaces of the Academy.

### 6.5 Ventilation Strategy

This section of the report aims to provide guidance to the M&E Engineer and the Design Team with regards to possible opportunities to adopt natural ventilation from an acoustic perspective. BB93 provides the following outline guidance for determining an appropriate ventilation strategy based upon the as measured external ambient noise levels:

*‘... Where the external ambient free-field noise levels do not exceed the indoor ambient noise level requirement by more than 16dB for single sided ventilation spaces and 20dB for cross ventilated or roof ventilated spaces, the criteria for natural ventilation can usually be achieved ...’*

The guidance document entitled ‘*Acoustics of Schools: a design guide*,’ as published jointly by the IoA and the ANC, provides the following guidance in relation to the sound reduction provided by an open window:

*‘... The laboratory measured airborne sound insulation of partially open single-glazed windows, or double-glazed windows with opposite opening panes, is approximately 10-15dB ...’*

On this basis, taking into consideration the required indoor ambient noise level requirements for the Academy, as stated in Table 6 and the various relaxations that can be applied, the following recommendations are provided with regards to the ventilation/overheating strategy:

1. The use of open windows could be used to provide natural ventilation all spaces of the Academy.
2. The use of opening window as a means of ventilation to teaching spaces which are expected to generate high levels of activity noise (including: Music classrooms, Practice Rooms, Assembly Hall Activity Studio etc.) should ideally be avoided to reduce sound transmission to external areas and to other internal areas via open windows.

### 6.6 External Roof

Details of the existing and proposed roof constructions have not yet been confirmed. The roof construction will need to be designed in order to control the following acoustic considerations:

- Environmental noise break-in
- Impact noise from rainfall
- Sound flanking transmission between internal spaces
- Noise intrusion from any externally mounted building services equipment

A detailed acoustic review of the proposed roof construction will need to be undertaken following confirmation of the proposed build-up. It should be noted that lightweight roof constructions, whether prefabricated or a site built systems, typically provide a lower sound insulation performance as compared to that typically provided by solid masonry constructions.

### 6.7 External Rooflights

Rooflights are currently proposed to the sports hall, activity studio, dining room and science laboratories. In order to control environmental noise ingress and impact noise from rainfall, it is recommended that an allowance be included for double glazed rooflights, with outer laminated panes. A suitable specification will be provided as the design develops.

The use of an ETFE or polycarbonate rooflights should be avoided as these are typically poor acoustically with regards to the control of environmental noise break-in and rain noise.

6.8 Daytime Environmental Noise in External Teaching Areas

AOS states that noise levels prevailing in unoccupied playgrounds, playing fields and other outdoor areas should not exceed 55dB  $L_{Aeq,30mins}$  and that there should be at least one area suitable for outdoor teaching activities where noise levels are below 50dB  $L_{Aeq,30mins}$ . Where this is not possible (e.g., due to the lack of suitably quiet sites), acoustic screening should be employed to reduce noise levels in these areas as far as is practicable.

In order to predict the likely daytime ambient noise levels as expected within the proposed external training areas as due to road traffic on Long Lane, a proprietary 3D computer noise model of the site have been generated using the DataKustik “CadnaA” Noise Mapping software.

Figure 5 shows the predicted environmental noise levels expected at the external amenity areas, as based on the results of the environmental noise survey and Sol’s computer-based 3D environmental noise model.

Figure 5 shows that the ambient noise levels as expected at the south of the site, within c.65 metres distance from Spring Lane exceed the AOS defined *upper* limit of 55dB  $L_{Aeq,30min}$ .

However, the predicted ambient noise levels at the location of each of the proposed external MUGA and sports pitches is below AOS defined *upper* limit of 55dB  $L_{Aeq,30min}$ .

There are areas of the proposed external teaching areas to the north of the site where the predicted ambient noise levels are below the desirable limit of 50dB  $L_{Aeq,30min}$ .



As such, appropriate ambient noise levels are expected to be achieved within the proposed external teaching areas without need for further noise mitigation.



Figure 5: Predicted daytime ambient noise levels (dB  $L_{Aeq,30min}$ ) in outdoor amenity areas



7 BUILDING SERVICES PLANT

7.1 Acoustic Performance Specification Requirements

7.1.1 Environmental (Atmospheric Side) Plant Environmental Noise Limits

Based upon the results of the environmental noise survey, Table 7 shows appropriate maximum permissible *cumulative* noise Rating Level limits which are applicable at the identified noise sensitive receptors.

These noise Rating Level limits are applicable to any required operating condition (including all plant operating simultaneously at the highest required duty etc.) and have been derived based upon the requirements of BREEAM Credit Pol 05 (equivalent to 5dB below the as measured typical daytime and night time Background Sound Levels):

| Noise Sensitive Receptor                            | Maximum Permissible Noise Rating Level Limit, dB $L_{A_{r,Tt}}$<br>For BREEAM Credit Pol 05 Compliance |                               |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------|-------------------------------|
|                                                     | Daytime (07:00 – 23:00hrs)                                                                             | Night Time (07:00 – 23:00hrs) |
| Shirebrook Drive<br>(c.40 metres to the south west) | 40                                                                                                     | 32                            |
| Bury Road,<br>(c.40 metres to the east)             | 40                                                                                                     | 32                            |

Table 7: Maximum permissible cumulative environmental noise level limits at receptors



8 MUGA NOISE IMPACT ASSESSMENT

The new Academy will include six new Multi Use Games Area (“MUGA”) which are to be located within the vicinity of existing residential premises. The predicted noise level impact has been assessed in accordance with relevant absolute noise level limit guidance for the assessment of community noise as provided by the WHO (See Section 3.5) as well as considering the change in noise level in accordance with IEAM guidance (See Section 3.6).

The Association of Noise Consultants (“ANC”) and Sports England published ‘*Guidance Note on Artificial Grass Pitch (“AGP”) Acoustics – Planning Implications* (2017)’ which includes information on MUGAs indicates that a typical noise level from an AGP/MUGA when in use for **team sports** generates a typical free-field noise level of c.58dB  $L_{Aeq,1h}$  when measured at a distance of 10 metres from the sideline halfway marking.

Sol’s 3D noise model of the Academy has been used to assess the potential noise impact from the proposed MUGA on the surrounding residential receptors. Table 8 provides as assessment of the noise impact from the proposed MUGAs on the surrounding residential receptors in accordance with WHO guidelines for community noise. Table 9 provides as assessment of the noise impact from the proposed MUGAs on the surrounding residential receptors in accordance with IEAM guidelines. The corresponding noise map is shown in Figure 6:

| Noise Sensitive Receptor | MUGA Assessment in Accordance with WHO Guidelines for Community Noise |                                   |
|--------------------------|-----------------------------------------------------------------------|-----------------------------------|
|                          | Predicted Specific Sound Level, dB $L_{Aeq,1hour}$                    | WHO Assessment Outcome            |
| Shirebrook Drive         | 47                                                                    | Below onset of moderate annoyance |
| Bury Road                | 46                                                                    | Below onset of moderate annoyance |

Table 8: MUGA Assessment in accordance with WHO Guidelines for Community Noise

| Noise Sensitive Receptor | MUGA Assessment in Accordance with IEAM Guidelines   |                                                              |                                          |                                                     |                                    |
|--------------------------|------------------------------------------------------|--------------------------------------------------------------|------------------------------------------|-----------------------------------------------------|------------------------------------|
|                          | Pre-Existing Ambient Sound Level, dB $L_{Aeq,1hour}$ | Predicted Specific Sound Level from MUGA, dB $L_{Aeq,1hour}$ | Combined Sound Level, dB $L_{Aeq,1hour}$ | Predicted Change in Sound Level, dB $L_{Aeq,1hour}$ | IEAM Guidelines Assessment Outcome |
| Shirebrook Drive         | 51.7                                                 | 46.7                                                         | 52.9                                     | +1.2                                                | Minor                              |
| Bury Road                | 49.2                                                 | 45.9                                                         | 50.8                                     | +1.6                                                | Minor                              |

Table 9: MUGA Assessment in accordance with IEAM Guidelines

Table 8 shows that the predicted Specific Sound Level as occurring with all MUGA used simultaneously is below the WHO guidance outcome for the onset of a moderate annoyance at the worst affected residential dwelling on Shirebrook Drive and Bury Road. Similarly, Table 9 shows that the change in noise level as due to noise from the MUGAs results in a minor impact when assessed in accordance with IEAM guidance.

This assessment also does not consider that there are already existing MUGAs at the location of the site which are used by the existing Spring Lane School.



Therefore, the noise emitted from the use of the MUGAs is highly unlikely to be of any adverse effect to the surrounding noise sensitive receptors.

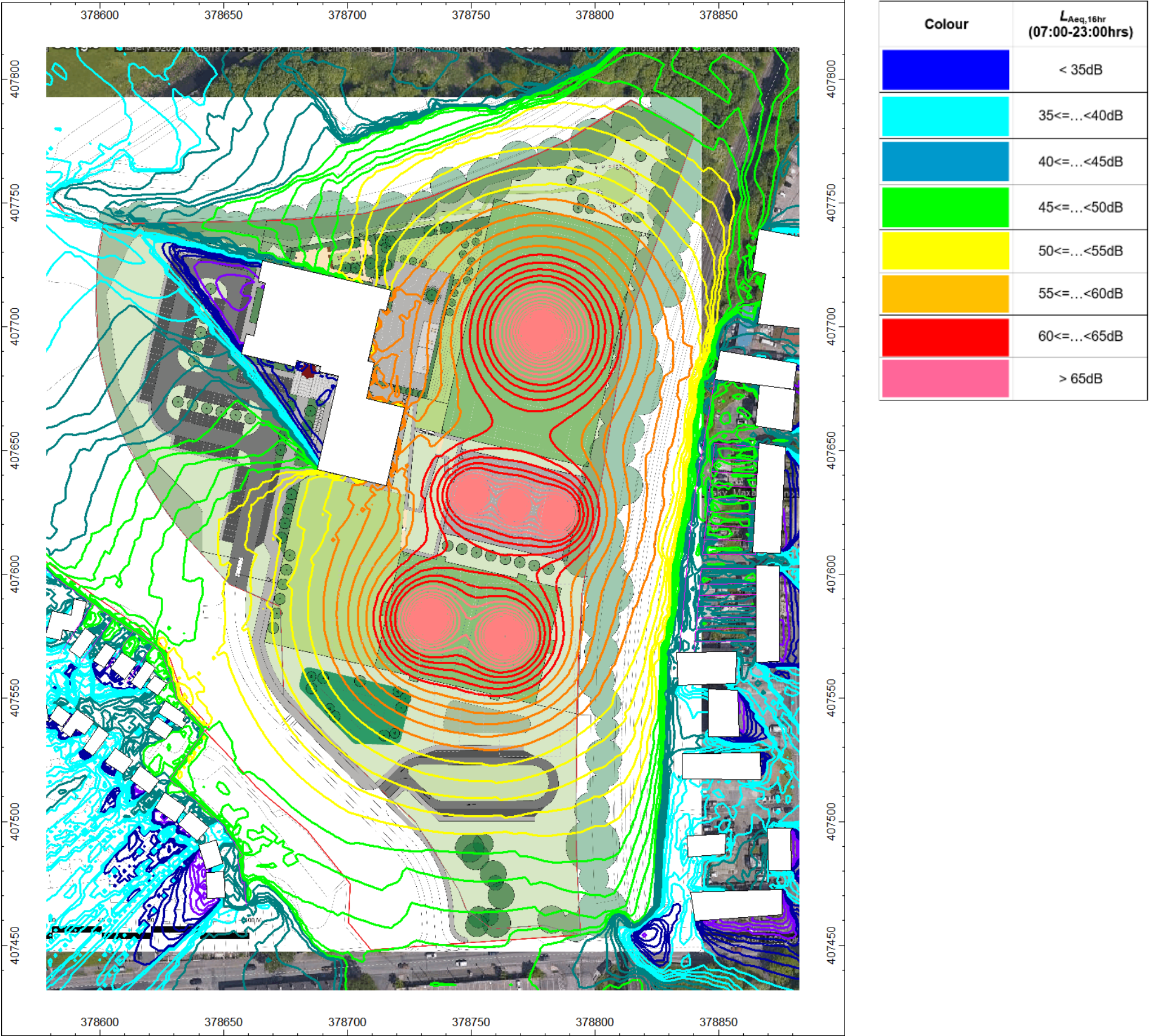


Figure 6: Aerial view of noise emissions from the MUGAs

## APPENDIX A GLOSSARY OF ACOUSTIC TERMS

| Term                              | Abbreviation            | Description                                                                                                                                                                                       |
|-----------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sound Pressure Level              | $L_{pA}$                | A measure of the sound pressure at a particular location. Typically expressed in dB(A) referenced to $2 \times 10^{-5}$ Pascals.                                                                  |
| Equivalent Continuous Sound Level | $L_{Aeq,T}$             | The steady level of sound over a prescribed period of time which would contain the same total sound energy as the actual fluctuating noise under consideration in the same period of time.        |
| Statistical Sound Levels          | $L_{A10}$ and $L_{A90}$ | The level of noise exceeded for a percentage of the time period being sampled typically either 10% or 90%.                                                                                        |
| Background Sound Level            | $L_{A90,T}$             | The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval.                                                           |
| Maximum Sound Level               | $L_{Amax}$              | The maximum sound or noise level determined with instrumentation set to either a fast time weighting, $L_{AFmax}$ , or a slow time weighting, $L_{ASmax}$ .                                       |
| Sound Power Level                 | $L_{WA}$                | A measure of the total sound energy radiated from a source. Like sound pressure levels this is also expressed in dB(A), but instead it is referenced to $10^{-12}$ W.                             |
| Broadband                         |                         | Over a wide range of frequencies.                                                                                                                                                                 |
| Narrow-band                       |                         | Acoustic Energy over a restricted range of frequencies. Used to ascertain the strength of audible tones, and to assist in identifying particular sources of noise in a complex sound environment. |
| Ambient Sound                     |                         | Totally encompassing sound in a given situation at a given time usually composed of sound from many sources, near and far.                                                                        |
| Specific Sound Level              | $L_{eq,Tr}$             | The Equivalent Continuous A-Weighted Sound Level at an assessment position produced by a specific sound over a given referred time interval, $Tr$                                                 |
| Rating Level                      | $L_{Ar,Tr}$             | The Specific Sound Level plus any adjustment for the acoustic characteristic features of the noise (e.g. intermittency, tones etc.)                                                               |
| Residual Noise                    | $L_{Aeq,T}$             | The ambient sound remaining at given position in a given situation when the specific sound source is suppressed to a degree such that it no longer contributes to the ambient sound.              |
| Sound Reduction Index             | $SRI$                   | The reduction in sound energy when transmitted through a panel or similar planar element, used typically in relation to single octave or one-third octave frequency band values.                  |
| Weighted Sound Reduction Index    | $R_w$                   | The Sound Reduction Index expressed as a single figure.                                                                                                                                           |
| Dynamic Insertion Loss            | $DIL$                   | Reduction in acoustic energy resulting from the insertion of a noise control element (e.g. a silencer).                                                                                           |
| Occupied spaces                   |                         | A room or space within the assessed building that is likely to be occupied for 30 minutes or more by a building user.                                                                             |

**APPENDIX B NOISE SURVEY DETAILS & SUMMARY RESULTS**

**LOCATION**

Spring Lane School, Radcliffe, Manchester

**DATES & TIMES**

7<sup>th</sup> June to 8<sup>th</sup> June 2023

**WEATHER CONDITIONS**

| Date       | Daytime (07:00 - 23:00) |          |                |                         | Night Time (23:00 – 07:00) |          |                |                         |
|------------|-------------------------|----------|----------------|-------------------------|----------------------------|----------|----------------|-------------------------|
|            | Temp, °C                | Rain, mm | Wind Direction | Average Wind Speed, m/s | Temp, °C                   | Rain, mm | Wind Direction | Average Wind Speed, m/s |
| 07/06/2023 | 15                      | 0.0      | E              | 2.5                     | 9                          | 0.0      | NE             | 1.3                     |
| 08/06/2023 | 12                      | 0.0      | E              | 2.4                     | -                          | -        | -              | -                       |

**PERSONNEL PRESENT DURING MEASUREMENTS**

Chris Downing MMath - Sol Acoustics Ltd

**INSTRUMENTATION**

*Measurement Positions 1,2,3*

01dB Cube Sound level meter (serial no. 12070)  
01dB Pre22 Microphone preamplifier (serial no. 1915040)  
GRAS 40CD Microphone capsule (serial no. 288057)  
01dB Cal21 Acoustic calibrator (serial no. 34675320)

*Measurement Position 4*

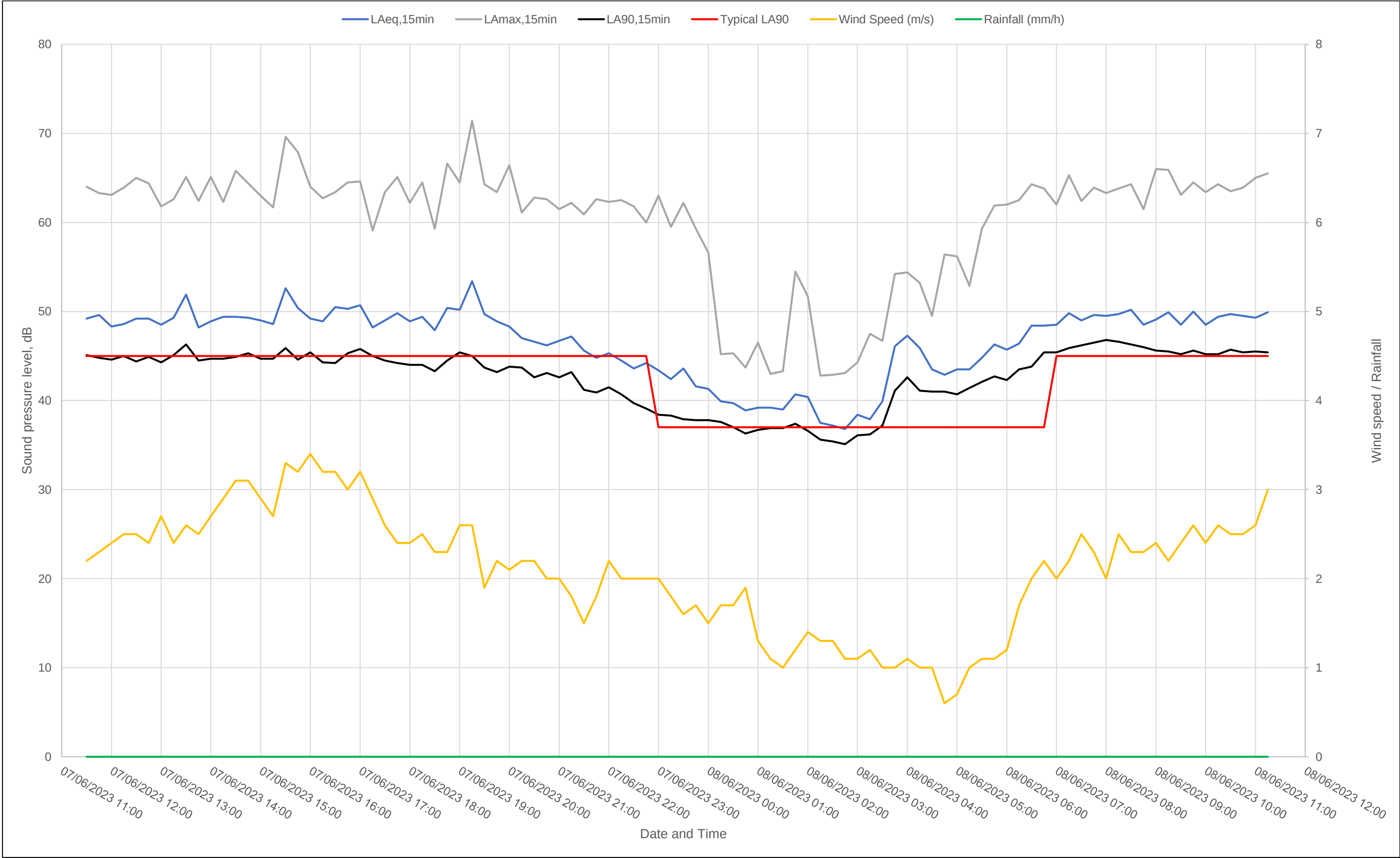
01dB Cube Sound level meter (serial no. 11348)  
01dB Pre22 Microphone preamplifier (serial no. 1805362)  
GRAS 40CD Microphone capsule (serial no. 260642)  
01dB Cal21 Acoustic calibrator (serial no. 34675320)  
Vaisala WXT520 Weather Station

**METHODOLOGY**

Before and after the measurements the sound level meters were checked and calibrated to an accuracy of  $\pm 0.3\text{dB}$  using the 01dB CAL 21 Calibrator. The calibrator produces a sound pressure level of 94 dB re  $2 \times 10^{-5}$  Pa @ 1kHz.

**MEASUREMENT RESULTS**

Graph A1 summarises the results obtained from the noise survey at Measurement Position MP4.



Graph A1: Graph showing measured environmental noise levels as measured at Measurement Position MP4



APPENDIX C   DETAILS AND PROFESSIONAL QUALIFICATIONS OF CONTRIBUTING SOL STAFF

Company Details

**Name of Organisation:** Sol Acoustics Limited

**Status:** Private Limited Company

**Address:** Unit 11, Brunel Court,  
Gadbrook Park  
CW9 7LP

**Telephone Number:** 01565 632535

**E-Mail:** [info@solacoustics.co.uk](mailto:info@solacoustics.co.uk)

**Nature of Business:** Acoustic Consultancy

**Directors:** Simon Ferenczi

**Company Registration Number:** 4218702

Key Technical Personnel & Qualifications

|                |                                                                |
|----------------|----------------------------------------------------------------|
| Simon Ferenczi | Institute of Acoustics Diploma (with additional modules), MIOA |
| Brian Horner   | BSc (Hons), MIOA                                               |
| Chris Downing  | MMaths                                                         |

Company Accreditations

Sol Acoustics is a member of The Association of Noise Consultants (ANC) and is qualified to perform sound insulation testing under the ANC's accredited testing scheme to demonstrate compliance with the requirements of Approved Document E of the Building Regulations.