Technical Note

Project:	**Rosedale College**	Job No:	**60710616**
Subject:	**Noise Impact Assessment**		
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Introduction

The following noise impact assessment has been undertaken for inclusion within the planning application for the redevelopment works proposed at the existing Rosedale College site. The below information discusses the proposed acoustic design approach for the building and the expected impact of noise from the development upon nearby residents. Comment as to how the noise emission will compare with various guidance documents has also been provided.

Acoustic Design Statement

The proposed design intent for Rosedale College will be to demonstrate compliance with the Building Regulations Approved Document E (ADE) Requirement E4 primarily for all new College spaces by incorporating the design guidance provided within BB93 (2015) with regards to indoor ambient noise levels, sound insulation performances and room acoustics.

The noise impact from the proposed development has also been considered in line with relevant guidance such as that included within BS 4142:2014+A1:2019 Method for Rating and Assessing Industrial and Commercial Sound and other Local Authority Guidance.

Existing Ambient and Background Noise Levels

A "Noise Assessment Report" has been issued by HSP Consulting Ltd on behalf of the Education Funding Agency, dated 28th February 2022, and contains the results of an external noise survey undertaken at the proposed site (relevant excerpts are included in Appendix A). The findings of this survey indicate that external noise levels at locations close to the facades of the proposed new building are expected to be between 49 dB and 56 dB $L_{Aeq,T}$ during a typical working day, depending on how exposed they are to Wood End Green Road. It is noted that the main source of noise was owing to road traffic along with noise from the school sports field and the adjacent primary school.

Similar noise levels are also expected to influence the nearest noise sensitive receptors located on Wood End Green Road, Judge Heath Road, Cromwell Road and Leven Way.

The lowest measured background noise levels are presented in below, split into day, evening and night time periods. An early morning scenario is also outlined. These are considered to be representative of the background noise levels experienced at the nearby residential properties.

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Time Period	Lowest measured L_{A90} (dB)
Daytime 07:00-19:00	46
Evening 19:00-23:00	42
Night-time 23:00-07:00	39
Early Morning 05:00-07:00	42

Table 1 Lowest Measured Background Noise Levels

Noise Ingress

Noise ingress into the proposed college has been considered based on the current survey results and the latest room layouts. The noise climate is anticipated to be suitably controlled with a natural ventilation system utilising restricted windows or acoustic ventilators based on the proposed brick finish or a fibre cement cladding system and double-glazed windows. The current proposal is that the building utilise a mix of ventilation methods. Generally, to teaching areas a hybrid cross Monodraft® ventilation system is proposed taking air from the façade which is extracted via another vent to the corridor. Some rooms, such as music practise rooms, changing areas, WC's, kitchen, some staff rooms, rooms located internally or with small façade areas including internal corridor areas, will incorporate mechanical ventilation with external air handling units located on the roof area. The activity studio, drama studio and assembly hall are expected to incorporate Monodraft® windcatchers on the roof. Other staffrooms and offices along with some circulation/stairwells located on the façade are to be naturally ventilated.

Noise ingress into the proposed teaching spaces is expected to be suitably controlled such that the indoor ambient noise levels given within BB93 for the various spaces will be achieved. Openable windows are to be provided to teaching and office areas to allow for additional summer purge ventilation, this will be at the discretion of the occupant and is expected to achieve the BB93 guidance criteria for this scenario.

Noise Egress

Noise breakout from general activities within the college are unlikely to affect the neighbours as the building facade is to be designed to control moderate levels of noise ingress. The façade will therefore act to control noise breakout.

Given the site's use is not changing and the existing facilities include similar internal spaces and external sports areas used by the college and for community use, this is not anticipated to result in any significant changes when compared to the noise environment currently experienced as a result of these college and community use activities.

Plant Noise Emissions

Guidance Criteria

BS 4142: 2014+A1:2019 Method for Rating and Assessing Industrial and Commercial Sound

The scope of BS 4142 is limited to the assessment of "*outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident*".

The basis of BS 4142 method is a comparison between the background sound level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

• *Background Sound Level* – $L_{A90,T}$ dB – defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels;

• *Specific Sound Level* – $L_{Aeq,Tr}$ dB – the equivalent continuous 'A' weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T;

• *Residual Sound Level* – $L_{Aeq,T}$ dB – the equivalent continuous 'A' weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and

• *Rating Level* – $L_{Ar,Tr}$ dB – the specific sound level plus any adjustment made for the characteristic features of the noise such as tonality, impulsivity and intermittency.

It should be noted that the residual sound level and the background sound level should not contain any appreciable contributions from the specific sound source. It is therefore important to carefully define the specific sound source, which can be one sound source, or multiple sound sources assessed collectively.

When comparing the *Background Sound Level* and the *Rating Level*, the standard states that:

a) "*Typically, the greater the difference, the greater the magnitude of the impact.*

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

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

d) The lower the Rating Level is to the measured Background Sound Level, the less likely it is that the specific sound 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 upon the context."

Importantly, as indicated above, BS 4142 requires that the *Rating Level,* L_{Ar} dB, of the sound source under assessment be considered in the context of the environment when defining the overall significance of the impact. The standard suggests that in assessing the context, all pertinent factors should be taken into consideration, including the following:

1) "The absolute level of sound;

2) The character and level of the residual sound compared to the character and level of the specific sound; and

3) The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions."

Regarding the monitoring reference time period:

• A reference period of 1 hour is used for daytime noise between 07:00hrs and 23:00hrs; and

• A reference period of 15 minutes is used for night-time noise between 23:00hrs and 07:00hrs.

The measured specific sound source is corrected for acoustic features (if present) of intermittency, impulsivity and tonality to give the rated noise level as shown in the table below.

Change in noise level, $L_{Aeq,T}$ (dB)	Proposed acoustic penalty
Tonality	2 dB if just perceptible 4 dB if clearly perceptible 6 dB if clearly perceptible
Impulsivity	3 dB if just perceptible 6 dB if clearly perceptible 9 dB if highly perceptible
Intermittency	If the on/off condition is distinctive against the residual acoustic environment a penalty of 3 dB can be applied
Other characteristics	If the specific sound features are neither tonal or impulsive though readily distinctive against the residual acoustic environment a penalty of 3 dB can be applied.

Table 2 Subjective Method to Evaluate the Specific Sound Acoustic Characteristic

Environmental Protection Act 1990

The Environmental Protection Act 1990 (EPA), Part 3 identifies that noise emitted from premises can, at certain levels, be prejudicial to health or give rise to statutory nuisance.

Local Authorities are required to investigate any public complaints of noise and if they are satisfied that a statutory nuisance exists, or is likely to occur or recur, they must serve a noise abatement notice. A notice is served on the person responsible for the nuisance. It requires either the abatement of the nuisance or works to abate the nuisance to be undertaken, or it prohibits or restricts the relevant activity.

In determining if a noise complaint amounts to a statutory nuisance the Local Authority can take account of various guidance documents and existing case law; however, no statutory noise limits exist. Demonstrating the use of 'Best Practicable Means' to minimise noise levels is an accepted defence against a noise abatement notice.

Local Authority's Guidelines

General guidance is provided on the London Borough of Hillingdon's website with regards to the control of noise from plant. This references the Supplementary Planning Document created by Hillingdon, Hounslow and Richmond upon Thames which seeks to protect and improve residential amenity in the boroughs. The guidance recommends that noise should be considered such that adverse effects are minimised, and good acoustic design measures should be adopted but specific control measured are not defined. Noise emission limits will therefore be proposed and submitted as part of the planning application for their review and agreement. Should more onerous conditions later be placed on the development the implications will be re-considered and incorporated into the plant design as the scheme is progressed further.

Plant Noise Emission Limits

The "Noise Assessment" issued by HSP consulting for Rosedale College outlines the existing measured background noise at the site. The lowest measured background levels during the relevant time periods are provided in Table 1 above. This covers an early morning period between 05:00-07:00 during which there is the potential for plant to operate to get the building to temperature before the school opens, so the impact during this period can be assessed.

Noise limits for mechanical plant to control noise impact have been set by HSP consulting and are designed to achieve a target value of 5 dB below the existing lowest measured background noise measured during their noise survey. These values are outlined below.

Time Period	$L_{Ar,1hr}$ (dB)
Daytime 07:00-19:00	41
Evening 19:00-23:00	37
Night-time 23:00-07:00	34
Early Morning 05:00-07:00	37

Table 3 Noise rating level design limits at nearest dwellings for new equipment

The limits set should be met with all plant operating simultaneously. Where the plant contains acoustic features of intermittency, impulsivity and tonality these will need to be corrected for within the assessment.

Initial Plant Noise Assessment

The current external plant proposals associated with the development include for the provision of a number of small roof mounted AHU units and an extract fan. In addition, two air source heat pumps are proposed to be located within an external plant enclosure at ground level along with an energy centre in which a water source heat pump is to be located. A few small plant and server rooms are also proposed within the various teaching blocks.

An initial assessment has been undertaken based on the following externally located items, these are as detailed for each of the teaching blocks:

NTB1: 2 AHU units- DV800.

NTB2: 2 AHU units -DV500, DV800. A CAS10410-3 colourfan and TII500/43-3 extract fan.

EFAC: 2 AHU units -DV500, DV150.0

External enclosure: 2 Air source heat pumps- Carrier 30RQP 310R.

Based on the manufacturer's noise data provided to us for these units, the locations as shown on the latest MEP layouts and accounting for distance attenuation based on these distances to the nearest noise sensitive receptors which range from around 33m to 137m, provided the AHU and fan exhaust routes are suitably attenuated (attenuators are currently allowed for within the design) and that the air source heat pumps can be suitably attenuated (an acoustic package as is currently proposed), in addition to the acoustic mitigation measures are already proposed in the form of an fenced enclosure around the plant area and accounting for the proposed layout of the energy centre building will also provide some screening to the nearest receptors. The current proposals are anticipated to be capable of achieving the plant limits at the nearest noise sensitive receptor.

Given that noise levels from the proposed plant items are not finalised at this stage in the design. A detailed plant assessment will be undertaken as the design develops to fully inform attenuation measures expected to be required to achieve the proposed limits.

Appendix A- HSP Consulting Ltd

Noise Assessment

hsp consulting

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Reliance

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DATE ISSUED: **28th FEBRUARY 2022**

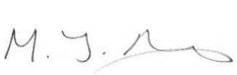
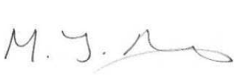
REPORT REFERENCE **P5314-R1-V1**

HSP CONSULTING LIMITED

ACOUSTIC FEASIBILITY ASSESSMENT

ROSEDALE COLLEGE, WOOD END GREEN ROAD, HAYES, MIDDLESEX UB3 2SE

REPORT VERSION CONTROL:

Document Reference	Date	Report Prepared by	Report Checked by	Report Authorised by
P5314-R1-V1	28/02/2022	M. J. Malone, MIOA	J. E. Noriega-Linares, PhD, MIOA, MCIEH	M. J. Malone, MIOA
				

CONTENTS

APPENDICES

1 INTRODUCTION

1.1.1 By instruction from HSP Consulting Limited ('the client'), NoiseAir was commissioned to undertake a feasibility stage noise impact assessment (NIA) as part of a feasibility study with respect to the proposed redevelopment of Rosedale College located at: Wood End Green Road, Hayes, Middlesex UB3 2SE, herein referred to as the 'development site'.

1.1.2 This acoustic report has been prepared as part of a feasibility study for the development and assesses the results of a noise survey conducted in accordance with applicable guidance, including recommendations and mitigation, as appropriate.

1.2 Site Description

1.2.1 Rosedale College is a Secondary School managed by Rosedale Hewens Academy Trust. It caters for Secondary pupils aged 11-19 years old. At the time of writing, the school is operational, however, a number of blocks have been identified for potential redevelopment.

1.2.2 Rosedale College is located on Wood End Green Road, Hayes, Middlesex, UB3 2SE, approximately three miles northeast of Hillingdon city centre. The site is bounded by residential properties on three sides of the site with allotments located opposite the main entrance. The site comprises of low-rise buildings of up to three storeys high.

1.2.3 It has been advised in documentation provided to NoiseAir that Rosedale College accommodates both special educational needs and disability (SEND) pupils and non-SEND pupils.

1.2.4 Rosedale College comprises of five standalone blocks, inclusive of a temporary accommodation unit EFAE. The wider site includes a studio school, primary school, sport centre and Hayes FM radio station.

1.2.5 **Figure 1** shows an aerial photograph of the development site with respect to the local area and its context.

Figure 1: Site aerial photograph

1.3 Site Development Proposal

1.3.1 **Figure 2** presented below outlines the existing building structure blocks which form Rosedale College.

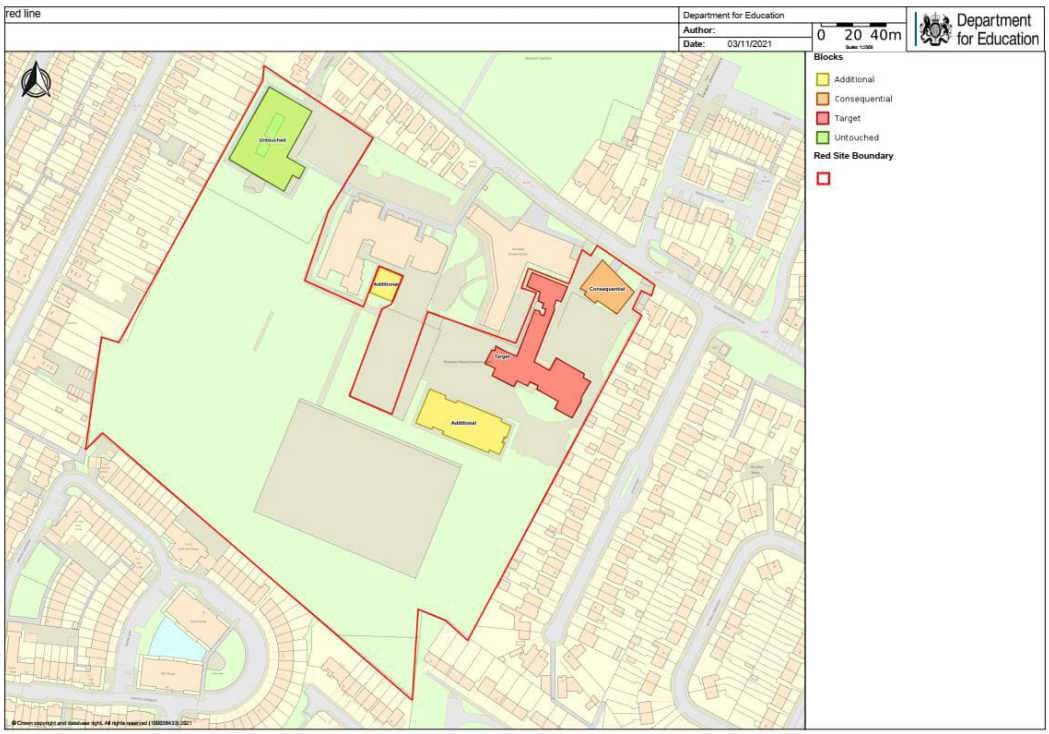


Figure 2: Department for Education School Block Designation

1.3.2 As outlined in **Figure 2,** a number of blocks have been identified as the following:

- Target blocks;
- Additional blocks;
- Consequential blocks; and,
- Untouched blocks.

1.3.3 **Table 1** below provides a summary of the identified block types as provides by the Department for Education (DfE).

Table 1: Summary of identified block types (Department for Education)

Identifier	Description
Target	This is a block that the selection process has identified as having both significant and urgent condition need and/or a limited design/structural life. Identification of this block indicates that SRP intends to undertake a condition need project on this school site. *Identified as red blocks on the site plan.*
Additional	This is a block that has not been identified by the selection process as being a target block. Nevertheless, it is a block that the condition survey confirms is in poor condition that will need major refurbishment or rebuilding works within the next 25 years or requires a significant level of works to retain the block's integrity. Consequently, the block will be pulled into scope and addressed. *Identified as yellow blocks on the site plan.*
Consequential	These are blocks which are highly likely to be impacted and require works by virtue of the works being undertaken to other blocks in scope (i.e. target blocks or additional blocks). These blocks do not require major works to address their condition need in the near future and are not blocks which the programme sets out to do work to. Consequential blocks are subdivided into three categories depending on the type of work required: • C1: Reconnection only; • C2: Demolition and re-provision; and, • C3: Consequential builing works (for access or other reasons) *Identified as orange blocks on the site plan.*
Untouched	These are blocks that are unlikely to require any works. *Identified as green blocks on the site plan.*
Proposed Development Zone	*Identified as a grey area on the site plan.*
Proposed Temporary Accommodation	*Identified as a purple area on the site plan.*

3 ACOUSTIC SURVEY

3.1 Acoustic Survey Details

3.1.1 NoiseAir conducted fixed position noise monitoring from the 1st of February 2022 to the 2nd of February 2022 at the development site.

3.1.2 Noise monitoring was conducted at one monitoring location, ML1. The noise monitoring location is presented in **Figure 4** and described in **Table 5**.

Figure 4: Noise monitoring locations.

Table 5: Summary of Noise Monitoring Locations

Monitor Location Number	Location Description	Time Period Monitored		Attended or Unattended Monitoring
		Start	End	
ML1	Mounted on a tripod on the flat roof of building structure EFAB towards the northern side, microphone located approximately 1.5 m above local roof level and approximately 3 m from the roof edge.	12:15 01/02/22	13:15 02/02/22	Unattended

3.1.3 The monitoring location was positioned to be representative of the noise levels at target block EFAB and is therefore considered representative of general ambient noise levels with respect to this block. Noise level data from this position is also considered representative for calibration of a preliminary 3D sound model (presented in Section 4).

3.1.4 The noise measurements were made using a Class 1, integrating sound level meter (SLM).

3.1.5 The acoustic equipment was calibrated to comply with Section 4.2 of BS 7445-1:2003[1] before and after the noise monitoring period.

3.1.6 Details of the SLM and associated field calibration can be found in **Table 6** below:

Table 6: Summary of SLMs used for survey and associated field calibration

SLM (Serial Number)	Preamp (Serial Number	Microphone (Serial Number)	Start Calibration	End Calibration	Drift
NOR140 (1405016)	NOR1209 (14242)	NOR1225 (118503)	-26.8	-26.6	-0.2

3.1.7 The weather conditions were noted to be as outlined in **Table 7** during the site visits at the start and end of the monitoring periods.

Table 7: Summary of weather conditions noted at the monitoring locations.

Parameter	1st of February 2022	2nd of February 2022
Roads (Wet / Dry)	Dry	Dry
Temperature (˚C)	12	12
Wind speed (ms^{-1}) / direction	Up to 3.9 / WNW (gusts)	Up to 2.9 W (gusts)
Cloud Cover (Approx. %)	10	30
Humidity (%)	70	69

3.1.8 A-weighted[2] L_{eq}[3] and L_{AMax}[4] noise levels were measured. The measured noise levels are set out in full in **Appendix C**.

3.1.9 Attending the development site at the start and end of the survey monitoring period provided opportunity for observations and detailed notes to be made of the significant noise sources which contribute to each of the measured levels.

ML1

Dominant noise at ML1 was that from distant and local road traffic. Secondary noise was that from the school sports field and the adjacent primary school.

[1] BS 7445-2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures.
[2] An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions.
[3] Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.
[4] The instantaneous maximum noise level recorded for a measurement period.

3.1.10 It should also be noted that, given that the school was operational at the time of the acoustic survey, the measured sound levels may contain contribution from playground noise breakout. BB93 recommended sound levels are advised to not include such noise sources, however, the effect is considered minimal and, therefore, unlikely to affect the survey result.

3.2 Measured Sound Levels

3.2.1 Data is shown in **Figure 5** detailing a level vs time graph of the recorded L_{Amax}, L_{Aeq} and L_{A90} sound level over 15-minute time periods for ML1.

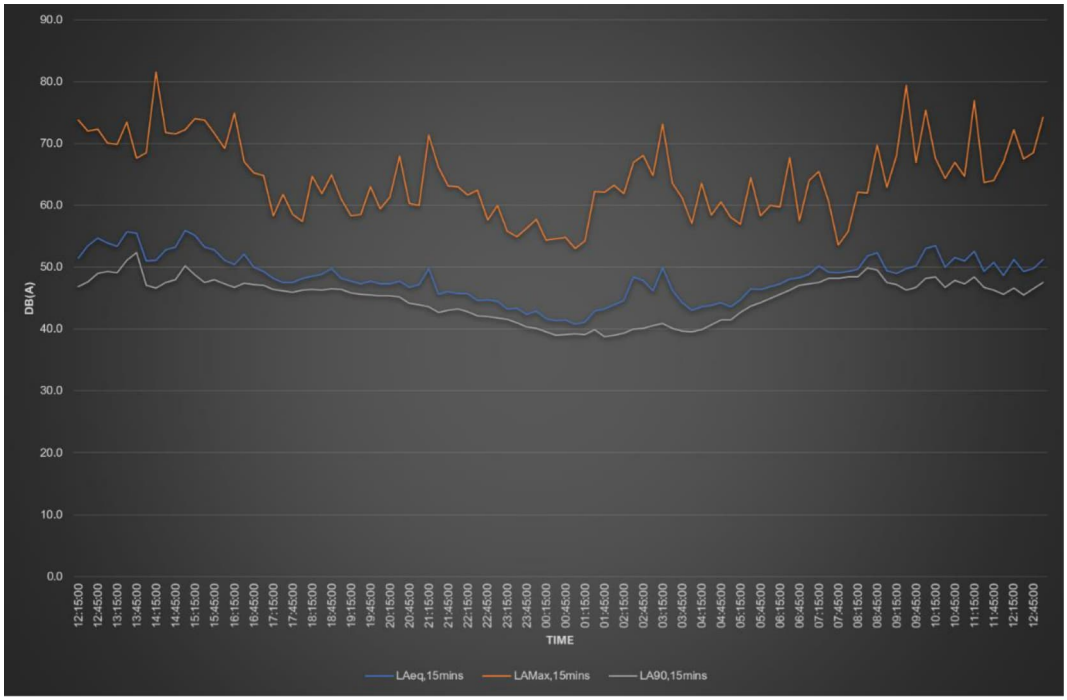


Figure 5: Level vs. time graph showing L_{Amax}, L_{Aeq} and L_{A90} sound levels – ML1

3.2.2 This assessment has been conducted in general accordance with '*BB93:2015, Acoustic design of schools*' and the '*ANC / IOA design guide of acoustics of schools*', therefore, the results for the monitoring locations are given in accordance these standards. Results are presented in **Table 8**, below. The data provided has been restricted to typical school hours which might encompass 09:00 to 17:00 hours (allowing for extended teaching hours).

Table 8: Average Measured Daytime and Night-time Noise Levels

Monitoring Location	Time	Measured Noise Level	
	Start	dB $L_{Aeq,30min}$	dB $L_{A90,1hour}$
ML1	09:00 - 17:00	49.3 – 55.6	46.1 – 50.5

3.2.3 **Figure 6** details the results of the data analyses for the $L_{Aeq,30min}$ levels in terms of the frequency of occurrence of each value at ML1 during the measurement time period 09:00 to 17:00 (typical school operating hours).

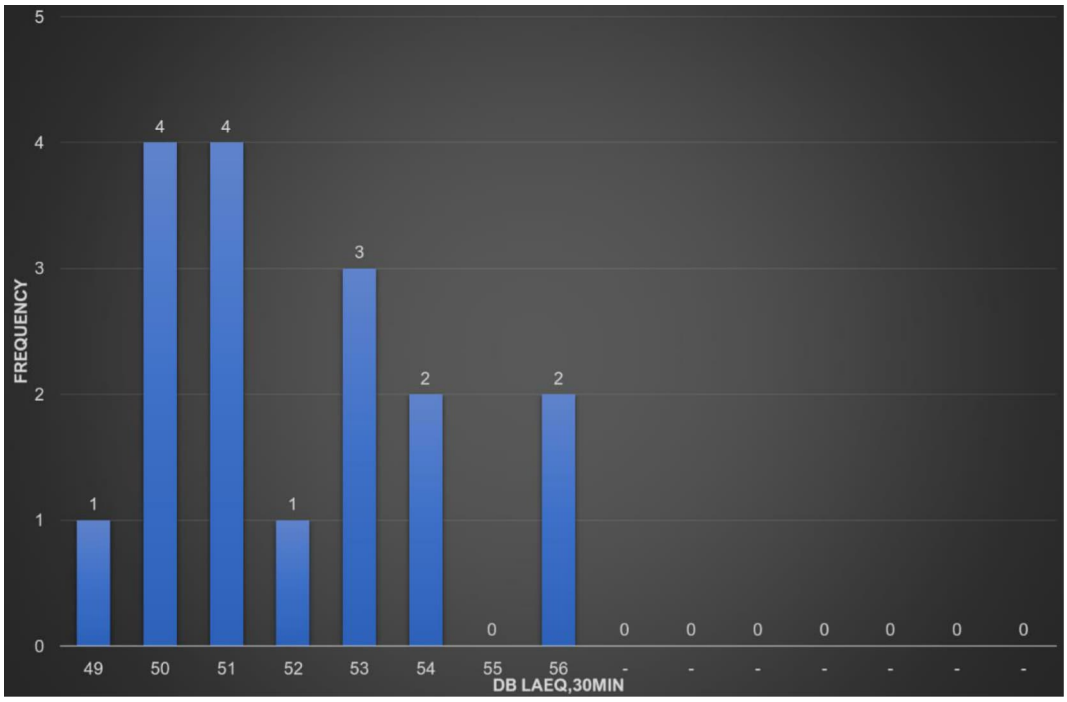


Figure 6: Data analysis of the daytime $L_{Aeq,30min}$ levels at ML1 during the measurement period 09:00 to 17:00.

3.2.4 **Figure 6** shows that the most common measured $L_{Aeq,30min}$ occurrence was 50/51 dB, however, given the dataset distribution, it is considered that a conservative value should be adopted of 56 dB $L_{Aeq,30min}$ for subsequent assessment.

3.2.5 **Figure 7** details the results of the data analyses for the background sound levels ($L_{A90,1hour}$) in terms of the frequency of occurrence of each value at measuring location ML1 during the measurement period 09:00 to 17:00.

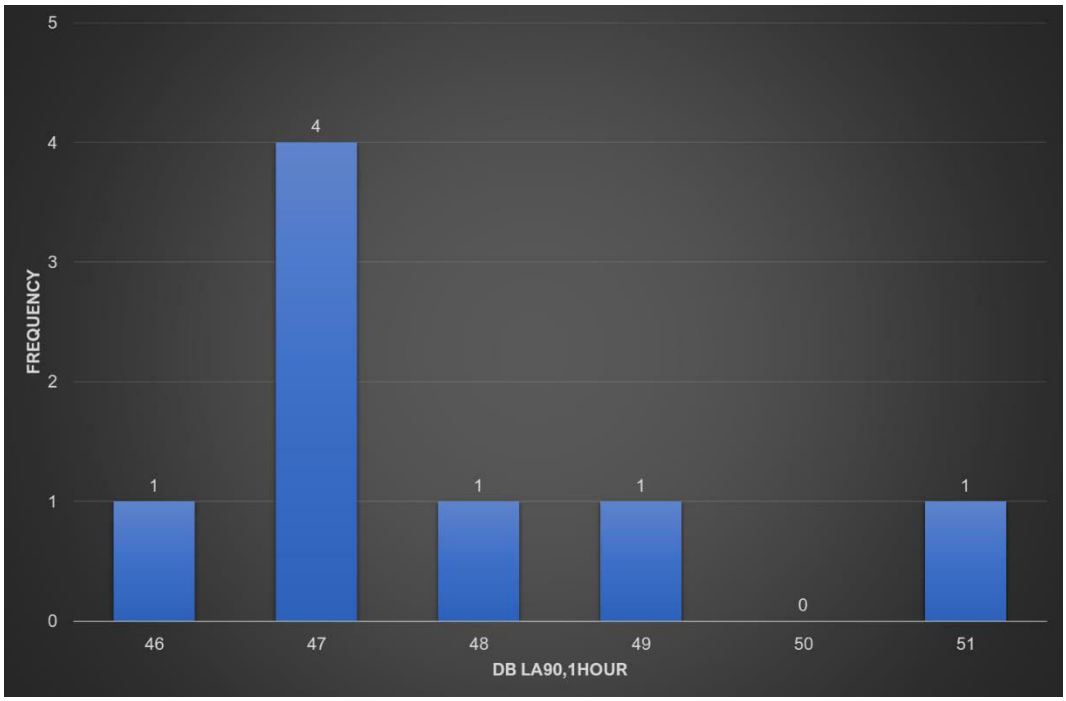


Figure 7: Data analysis of the daytime background ($L_{A90,1hour}$) sound level results – ML1 during measurement period 09:00 to 17:00.

3.2.6 Review of the dataset and data distribution presented in **Figure 7**, a conservative background sound level of 46 dB $L_{A90,1hour}$ is considered representative.

4 FEASIBILITY STAGE ASSESSMENT

4.1.1 A feasibility stage assessment regarding the criteria set out within the Building Regulation documentation, BB93:2015 and the Acoustics of School design guide has been conducted with reference to the sound levels measured at the development site.

4.1.2 To provide a preliminary indication of noise propagation at the development site a 3D sound model has been constructed.

4.2 3D Sound Model

4.2.1 A 3D sound model has been constructed in SoundPLAN™ to calculate the predicted sound propagation with respect to the development site and the surrounding significant noise sources. The model uses the calculation method from ISO 9613-2:1996[5] to account for the distance between the source and receiver and any screening or reflections provided by the surrounding buildings.

4.2.2 The model is based on and calibrated against data collected during the survey presented in Section 3 of this report as well as NoiseAir library data, SoundPLAN™ library data and / or traffic count data from the department of transport website, where appropriate.

4.2.3 It should be noted at this feasibility stage that the 3D sound model is considered preliminary in nature and based on assessment and measurement of the predominant noise sources as noted at the time of the acoustic survey undertaken by NoiseAir. An exhaustive assessment of all noise sources at and around the school site has not been undertaken and is not considered within the scope of a feasibility assessment. It should be noted therefore that detailed assessment of potential noise breakout from the development site and its surroundings is recommended at the appropriate stage and, subsequently, may require updating of the 3D sound model.

4.2.4 Based on observations during the NoiseAir site visit, the following noise sources have been identified as being predominant during the acoustic survey and, therefore, the following noise sources have been included within the 3D sound model.

- **Wood End Green Road** – 9+-modelled as a line source at a height of 0.5 m from ground level. Calibrated to noise level measured at ML1.
- **Judge Heath Road** – modelled as a line source at a height of 0.5 m from the ground level. Calibrated to same level as Wood End Green Road.

[5] ISO9613-2:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation"

- **Cromwell Road** – modelled as a line source at a height of 0.5 m from the ground level. Calibrated to same level as Wood End Green Road minus 3 dB(A) to account for the reduction in traffic.
- **Botwell Lane** – modelled as a line source at a height of 0.5 m from the ground level. Calibrated to same level as Wood End Green Road minus 3 dB(A) to account for the reduction in traffic.
- **Leven Way** – modelled as a line source at a height of 0.5 m from the ground level. Calibrated to same level as Wood End Green Road minus 9 dB(A) to account for the reduction in traffic.

4.2.5 A noise contour plot illustrating the propagation of the sound to receptor during the daytime $L_{Aeq,30min}$ is given in **Figure 8**.

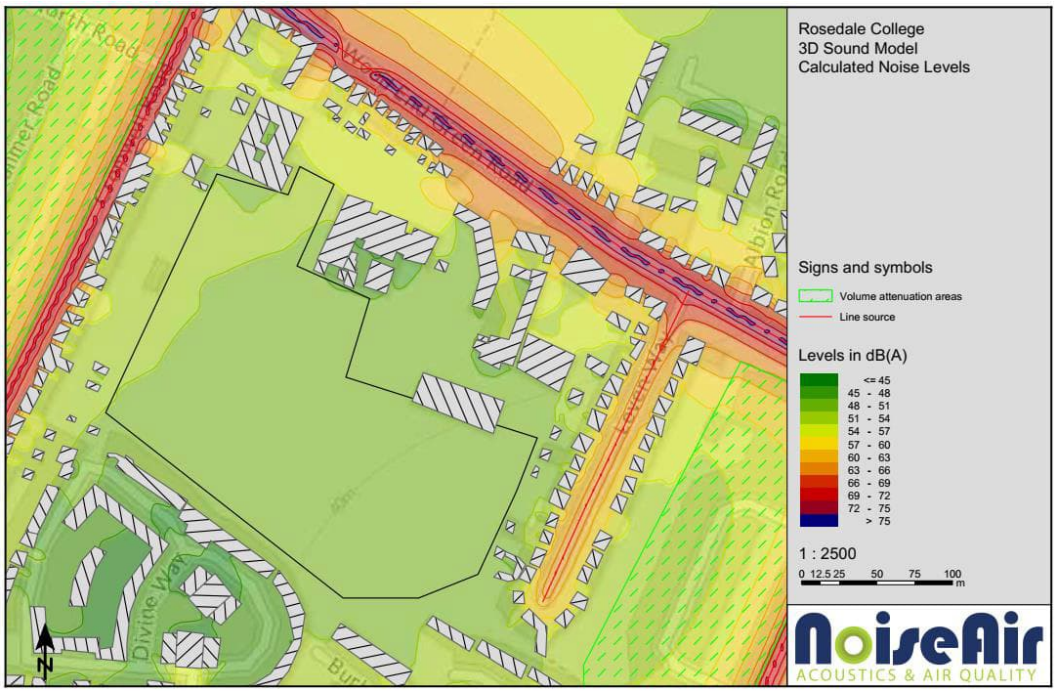


Figure 8: Noise contour plot illustration of the predicted propagation of sound to the site during the daytime – $L_{Aeq,30min}$.

4.2.6 Selected receptor locations across the development site are presented in **Figure 9**.

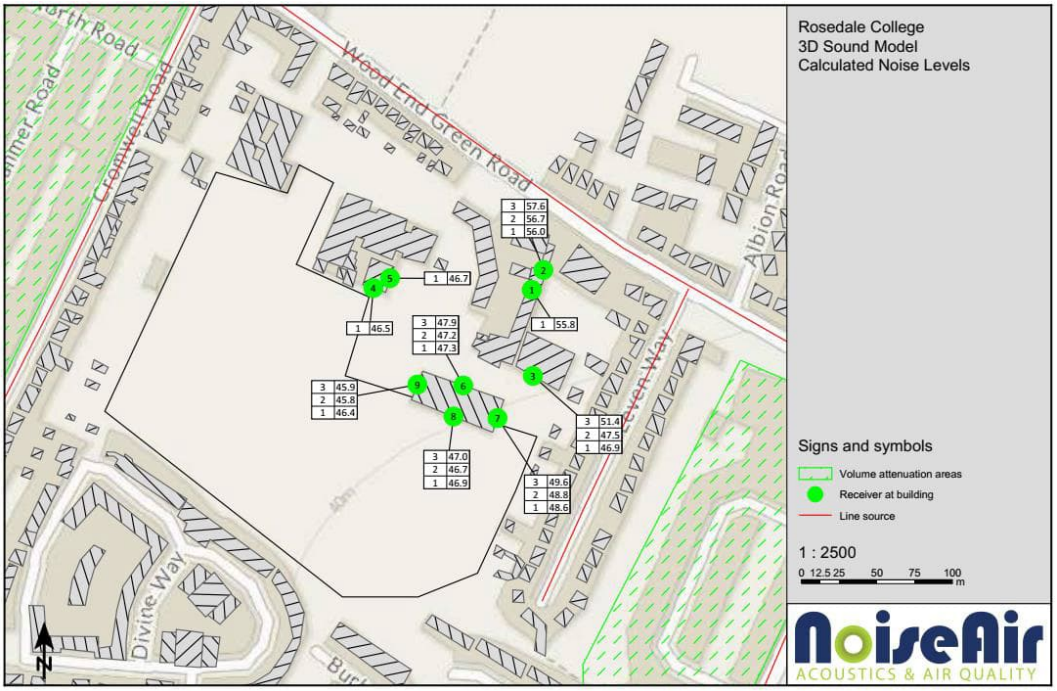


Figure 9: Plot illustration of the selected receptor locations across the development site.

4.2.7 Predicted façade readings have been calculated and are presented in **Table 9**.

Table 9: Predicted Levels

No.	Floor Level	Block	Façade	Calculated Levels $L_{Aeq,30min}$ (dB)
1	Roof (3.FL)	EFAB	-	55.8
2	GF		North	56.0
	1.FL			56.7
	2.FL			57.6
3	GF		South	56.9
	1.FL			47.5
	2.FL			51.4
4	GF	EFAD	South	46.5
5	GF		East	46.7
6	GF	EFAC	North	47.3
	1.FL			47.2
	2.FL			47.9
7	GF		East	48.6
	1.FL			48.8
	2.FL			49.6

Table 9: Predicted Levels				
No.	**Floor Level**	**Block**	**Façade**	**Calculated Levels $L_{Aeq,30min}$ (dB)**
8	GF		South	46.9
	1.FL			46.7
	2.FL			47.0
9	GF		West	46.4
	1.FL			45.8
	2.FL			45.9

4.3 BB93:2015 Assessment of Noise Levels in External Areas

4.3.1 It is noted that outdoor teaching areas are existing at the time of writing. The proposals provided to NoiseAir do not outline the redevelopment of any outdoor teaching areas and therefore subsequent assessment has not been progressed within this report.

5 PLANT NOISE LIMITS

5.1.1 It is considered likely that the proposed refurbishment and / or new build options will introduce new mechanical plant to the school site. Therefore, any new external plant installed as part of the proposals should be assessed in accordance with BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound.

5.1.2 It is recommended that a conservative approach is adopted to any mitigation that may be required for proposed mechanical plant at the development site. Consideration should also be given to the potential for noise disturbance to teaching activities at the school.

5.1.3 It is recommended that the rating level (measured / calculated in accordance with BS 4142:2014+A1:2019) from mechanical plant installed at the development site should not exceed 5 dB below the measured background sound level at the nearest noise sensitive receptor. This acoustic survey has measured a typical background sound level of 46 dB L_{A90}.

5.1.4 Good acoustic design is therefore recommended to ensure that mechanical plant which may form part of the proposals is located away from nearby local residents and away from noise sensitive areas of the proposed development such as teaching room windows. This is often achieved by installing mechanical plant within appropriately designed plant rooms or at roof level of a given building.

5.1.5 General recommendations for mechanical plant often require the use of appropriate anti-vibration mounts to ensure that vibration transfer into the building through structure borne vibration is minimised. Other typical solutions to minimise noise breakout typically include acoustic screens, acoustic enclosures, attenuators and acoustic louvres however the requirement of such measures is to be determined at detailed design stage.

APPENDIX A - REPORT LIMITATIONS

This Report is presented to HSP Consulting Limited and may not be used or relied on by any other person or by the client in relation to any other matters not covered specifically by the scope of this report.

Notwithstanding anything to the contrary contained in the report, NoiseAir Limited is obliged to exercise reasonable skill, care and diligence in the performance of the services required by HSP Consulting Limited and NoiseAir shall not be liable except to the extent that it has failed to exercise reasonable skill, care and diligence, and this report shall be read and construed accordingly.

This report has been prepared by NoiseAir Limited. No individual is personally liable in connection with the preparation of this report. By receiving this report and acting on it, the client or any other person accepts that no individual is personally liable whether in contract, tort, for breach of statutory duty or otherwise.

The conclusions and recommendations contained in this report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from who it has been requested and that such information is accurate. Information obtained by NoiseAir Limited has not been independently verified by NoiseAir Limited unless otherwise stated in the report and should be treated accordingly.

Where assessments of works or costs identified in this report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

Where / if estimates and projects are made within this report, are made based on reasonable assumptions as of the date of this report, such statements however by their very nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. NoiseAir Limited specifically does not guarantee or warrant any estimates or projects contained in this report.

DISCLAIMER- This report was prepared by NoiseAir Limited. The material in it contains NoiseAir Limited best judgment in light of the information available at the time of preparation of this report. Any use which a third party makes of this report, or any reliance on, or decisions based on it are the responsibility of such third parties. NoiseAir Limited accept no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

APPENDIX B – METER READINGS

ML1

Start Date	Start Time	Duration	L_{Aeq}	L_{AFMax}	L_{A90}
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
01/02/2022	12:15:00	00:15:00	51.5	73.8	46.9
01/02/2022	12:30:00	00:15:00	53.5	72.0	47.7
01/02/2022	12:45:00	00:15:00	54.7	72.4	49.0
01/02/2022	13:00:00	00:15:00	54.0	70.1	49.4
01/02/2022	13:15:00	00:15:00	53.4	69.9	49.1
01/02/2022	13:30:00	00:15:00	55.7	73.5	51.1
01/02/2022	13:45:00	00:15:00	55.5	67.7	52.4
01/02/2022	14:00:00	00:15:00	51.0	68.5	47.1
01/02/2022	14:15:00	00:15:00	51.2	81.6	46.7
01/02/2022	14:30:00	00:15:00	52.8	71.8	47.5
01/02/2022	14:45:00	00:15:00	53.3	71.6	48.0
01/02/2022	15:00:00	00:15:00	56.0	72.3	50.2
01/02/2022	15:15:00	00:15:00	55.2	74.0	48.8
01/02/2022	15:30:00	00:15:00	53.3	73.8	47.5
01/02/2022	15:45:00	00:15:00	52.8	71.7	48.0
01/02/2022	16:00:00	00:15:00	51.2	69.2	47.3
01/02/2022	16:15:00	00:15:00	50.5	74.9	46.8
01/02/2022	16:30:00	00:15:00	52.2	67.1	47.4
01/02/2022	16:45:00	00:15:00	50.0	65.3	47.2
01/02/2022	17:00:00	00:15:00	49.3	64.8	47.1
01/02/2022	17:15:00	00:15:00	48.2	58.3	46.4
01/02/2022	17:30:00	00:15:00	47.6	61.8	46.2
01/02/2022	17:45:00	00:15:00	47.5	58.6	46.0
01/02/2022	18:00:00	00:15:00	48.2	57.4	46.3
01/02/2022	18:15:00	00:15:00	48.6	64.7	46.4
01/02/2022	18:30:00	00:15:00	48.9	61.9	46.3
01/02/2022	18:45:00	00:15:00	49.8	64.9	46.5
01/02/2022	19:00:00	00:15:00	48.2	61.0	46.4
01/02/2022	19:15:00	00:15:00	47.8	58.3	45.9
01/02/2022	19:30:00	00:15:00	47.3	58.6	45.7
01/02/2022	19:45:00	00:15:00	47.8	63.1	45.5
01/02/2022	20:00:00	00:15:00	47.3	59.5	45.4
01/02/2022	20:15:00	00:15:00	47.3	61.4	45.4
01/02/2022	20:30:00	00:15:00	47.8	68.0	45.2
01/02/2022	20:45:00	00:15:00	46.8	60.4	44.2
01/02/2022	21:00:00	00:15:00	47.2	60.0	44.0
01/02/2022	21:15:00	00:15:00	49.8	71.3	43.6
01/02/2022	21:30:00	00:15:00	45.7	66.2	42.7
01/02/2022	21:45:00	00:15:00	46.1	63.2	43.1
01/02/2022	22:00:00	00:15:00	45.8	63.0	43.3
01/02/2022	22:15:00	00:15:00	45.8	61.7	42.8
01/02/2022	22:30:00	00:15:00	44.6	62.5	42.2
01/02/2022	22:45:00	00:15:00	44.7	57.7	42.1
01/02/2022	23:00:00	00:15:00	44.5	60.0	41.8
01/02/2022	23:15:00	00:15:00	43.3	55.9	41.6
01/02/2022	23:30:00	00:15:00	43.4	55.0	41.1
01/02/2022	23:45:00	00:15:00	42.4	56.3	40.4

Start Date	Start Time	Duration	L_{Aeq}	L_{AFMax}	L_{A90}
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
02/02/2022	00:00:00	00:15:00	43.0	57.8	40.1
02/02/2022	00:15:00	00:15:00	41.7	54.4	39.6
02/02/2022	00:30:00	00:15:00	41.4	54.6	39.0
02/02/2022	00:45:00	00:15:00	41.5	54.8	39.1
02/02/2022	01:00:00	00:15:00	40.8	53.0	39.2
02/02/2022	01:15:00	00:15:00	41.2	54.3	39.1
02/02/2022	01:30:00	00:15:00	43.0	62.3	39.9
02/02/2022	01:45:00	00:15:00	43.3	62.1	38.8
02/02/2022	02:00:00	00:15:00	44.0	63.3	39.0
02/02/2022	02:15:00	00:15:00	44.6	61.9	39.4
02/02/2022	02:30:00	00:15:00	48.4	67.0	40.0
02/02/2022	02:45:00	00:15:00	47.9	68.1	40.1
02/02/2022	03:00:00	00:15:00	46.2	64.8	40.6
02/02/2022	03:15:00	00:15:00	49.9	73.1	40.9
02/02/2022	03:30:00	00:15:00	46.3	63.6	40.1
02/02/2022	03:45:00	00:15:00	44.3	61.3	39.7
02/02/2022	04:00:00	00:15:00	43.1	57.1	39.6
02/02/2022	04:15:00	00:15:00	43.6	63.6	39.9
02/02/2022	04:30:00	00:15:00	43.9	58.5	40.7
02/02/2022	04:45:00	00:15:00	44.3	60.6	41.5
02/02/2022	05:00:00	00:15:00	43.6	58.1	41.5
02/02/2022	05:15:00	00:15:00	44.8	57.0	42.7
02/02/2022	05:30:00	00:15:00	46.6	64.5	43.7
02/02/2022	05:45:00	00:15:00	46.4	58.3	44.3
02/02/2022	06:00:00	00:15:00	46.9	60.0	45.0
02/02/2022	06:15:00	00:15:00	47.3	59.8	45.6
02/02/2022	06:30:00	00:15:00	48.1	67.8	46.3
02/02/2022	06:45:00	00:15:00	48.3	57.6	47.1
02/02/2022	07:00:00	00:15:00	48.9	64.1	47.3
02/02/2022	07:15:00	00:15:00	50.2	65.5	47.6
02/02/2022	07:30:00	00:15:00	49.2	60.7	48.2
02/02/2022	07:45:00	00:15:00	49.1	53.6	48.2
02/02/2022	08:00:00	00:15:00	49.4	55.8	48.5
02/02/2022	08:15:00	00:15:00	49.7	62.1	48.5
02/02/2022	08:30:00	00:15:00	51.8	62.0	49.9
02/02/2022	08:45:00	00:15:00	52.4	69.8	49.6
02/02/2022	09:00:00	00:15:00	49.5	62.9	47.5
02/02/2022	09:15:00	00:15:00	49.0	68.1	47.2
02/02/2022	09:30:00	00:15:00	49.8	79.4	46.3
02/02/2022	09:45:00	00:15:00	50.3	67.0	46.8
02/02/2022	10:00:00	00:15:00	53.1	75.4	48.2
02/02/2022	10:15:00	00:15:00	53.5	67.6	48.5
02/02/2022	10:30:00	00:15:00	50.0	64.4	46.8
02/02/2022	10:45:00	00:15:00	51.6	67.0	47.9
02/02/2022	11:00:00	00:15:00	51.0	64.7	47.3
02/02/2022	11:15:00	00:15:00	52.6	77.0	48.5
02/02/2022	11:30:00	00:15:00	49.4	63.7	46.8
02/02/2022	11:45:00	00:15:00	50.8	64.1	46.3
02/02/2022	12:00:00	00:15:00	48.7	67.1	45.6

Start Date	Start Time	Duration	L_{Aeq}	L_{AFMax}	L_{A90}
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
02/02/2022	12:15:00	00:15:00	51.3	72.2	46.7
02/02/2022	12:30:00	00:15:00	49.4	67.5	45.5
02/02/2022	12:45:00	00:15:00	49.8	68.5	46.5
02/02/2022	13:00:00	00:15:00	51.3	74.3	47.6