REPORT REFERENCE:

IMP7027-3

INDUSTRIAL NOISE IMPACT ASSESSMENT

INSTALLATION OF NEW AIR CONDITIONING PLANT

British Standard 4142:2014

CLIENT:

Ladbrokes Betting & Gaming Limited

Accounts Payable

New Castle House

Castle Boulevard

Nottingham

NG7 1FT

SITE:

40 North Road, Lancing, BN15 9AA

SURVEY DATE:

24th – 28th June 2021

Impact Acoustics Ltd

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1 EXECUTIVE SUMMARY

1.1 Instruction

Impact Acoustics Ltd have been instructed by Ladbrokes Betting & Gaming Limited to undertake a background noise survey at the proposed site at the existing building at 40 North Road, Lancing, BN15 9AA, to understand the level of impact at the site in relation to the proposed new air conditioning units at the side of the existing site and calculate the resultant noise level at the nearest affected windows at the nearest noise sensitive premises and carry out assessments to BS 4142: 2014.

1.2 Scope of Report

The measurements have been undertaken in accordance with British Standard 4142: 2014 and ISO 1996 – Part 2: 2017 to establish if the proposed air conditioning plant could have a demonstrable adverse effect in terms of noise that outweigh the benefits of the development. This report aims to establish the following:

- Existing background noise levels at the residential façade (L_{A90});
- Noise levels from the Proposed Plant (L_{Aeq});
- Impact on the nearest noise sensitive property.
- Mitigation Levels if Required.

1.3 Summary of Report

Continuous background noise measurements were undertaken between 24th – 28th June 2021 at the assessment position 1. The day time background noise levels between 07:00 and 23:00 was found to be $L_{A90,1\ hour}$ 42 dB. The night time background noise levels between 23:00 and 07:00 was found to be $L_{A90,1\ hour}$ 27 dB.

Daytime Equivalent Existing Background Noise Levels 7 days (07:00 – 23:00)	Measured Levels at Assessment Position 1	$L_{A90,t}$ 42 dB
Night time Equivalent Existing Background Noise Levels 7 days (08:00 – 18:00)	Measured Levels at Assessment Position 1	$L_{A90,t}$ 27 dB

1.4 Proposed Plant

The following plant is to be installed on the flat roof section at the side of the building:-
The following plant is to be installed within the newly formed internal plant room on the northern elevation of the building and is to be vented through acoustic louvres mounted within the existing window apertures.

Proposed Plant	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1.0k	2.0k	4.0k	8.0k	
1 x RZASG100MY1	63	62	58	56	52	47	42	38	58
1 x RZASG140MY1	53	56	52	54	47	46	38	32	54
2 x RXM25N9	60	60	59	58	53	49	44	37	59

1.5 Hours of Operation

The proposed units are for the use of an air conditioning system within a commercial building that only operates during daytime hours (08:00 – 22:00) and therefore the units will not operate during night time hours. Daytime assessments have been made for the proposed units.

1.6 Assessments

1.6.1 Daytime (07:00-23:00) with acoustic screen

Rating Level	33 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\ hour}$	42 dB	8.1	Modal Background Noise Level (0700 – 2300)
Assessment Level	-9 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	**-9 dB**		
Conclusion	**The assessment level is 'Low Impact'**		

1.7 Conclusions

The operation of the proposed air conditioning units has been assessed to establish if the development will have a demonstrable adverse effect in terms of noise that outweighs the benefits of the development. Measurements have been undertaken in accordance with British Standard 4142: 2014 and ISO 1996 – Part 2: 2017. This report has established the existing background noise levels at the closest noise sensitive facade to the proposed location and the assessment of the impact of the site operation on nearby properties. The resulting emissions from the plant running on a worst case scenario show no conflict with 'low impact' criteria and give a strong indication that complaints and impact on the local amenity is unlikely, provided the acoustic louvre is installed as detailed within this report.

It can be seen from the above assessments that with the proposed new air conditioning units operational, an assessment conclusion of Low Impact could be expected during daytime periods.

1.8 NPPF 2019

National Planning Policy Framework 2019 suggests that planning permission should be granted unless any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in the framework taken as a whole, or specific policies in the framework indicate the application should be restricted.

1.9 Planning Approval Recommendation

Based on the calculations and assessments made within this report it is the professional opinion of Impact Acoustics Ltd that the proposed air conditioning units can demonstrate compliance with the National Planning Policy Framework 2019, NPPF & NPSE and that, with regards to sound planning permission can be granted.

2 INTRODUCTION

2.1 Instruction

Impact Acoustics Ltd have been instructed by Ladbrokes Betting & Gaming Limited to undertake a background noise survey at the proposed site at the existing building at 40 North Road, Lancing, BN15 9AA, to understand the level of impact at the site in relation to the proposed new air conditioning units at the side of the existing site and calculate the resultant noise level at the nearest affected windows at the nearest noise sensitive premises and carry out assessments to BS 4142: 2014.

The purpose of this assessment is to ensure the acoustic protection of noise sensitive premises closest to the proposed air conditioning units. Noise sensitive premises are not restricted to residential dwellings as offices can be affected by unwanted external noise. These have been established as the premises within the immediate vicinity of the proposed units.

2.2 Ambient and Background Measurements

External noise levels are to be recorded over, what has been considered for the site, an average / typical time period in order to assess the daytime noise levels. Levels have been recorded over more than one day in order to ensure the uncertainty of measurement aspects of BS 4142: 2014 have been satisfied and that the data recorded is representative for the purpose of a robust assessment.

2.3 BS 4142: 2014

British Standard 4142: 2014 is to be adopted for the basis of this background noise level assessment. A BS 4142: 2014 noise assessment will be carried out in order to demonstrate the acoustic impact the proposed air conditioning units could have on the nearest affected premises and make suitable recommendations in order to demonstrate this unit will not have a significant and demonstrable adverse impact on the nearest noise sensitive premises in accordance with the National Planning Policy Framework, once remedial works are completed. BS 4142: 2014 supersedes the 1997 version and has been developed to move more in-line with the National Planning Policy Framework 2019 (NPPF) and the Noise Policy Statement for England 2010 (NPSE).

2.4 National Planning Policy Framework 2019 & Noise Policy Statement for England 2010

References and evaluations are to be made to the National Planning Policy Framework 2019 (NPPF) and the Noise Policy Statement for England 2010 (NPSE). The purpose of this document is to include all aspects of environmental noise within assessments i.e. environmental noise, neighbour noise and neighbourhood noise. Noise is to be considered alongside other relevant issues relating to the site and should not be considered in isolation, according to the NPSE.

There are several key phrases within the NPSE aims and these are discussed below.

2.5 "Significant adverse" and "adverse"

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

2.6 NOEL – No Observed Effect Level

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

2.7 LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.
Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

2.8 SOAEL – Significant Observed Adverse Effect Level

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

It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

3 MEASUREMENT POSITIONS



Position 1 – Yellow

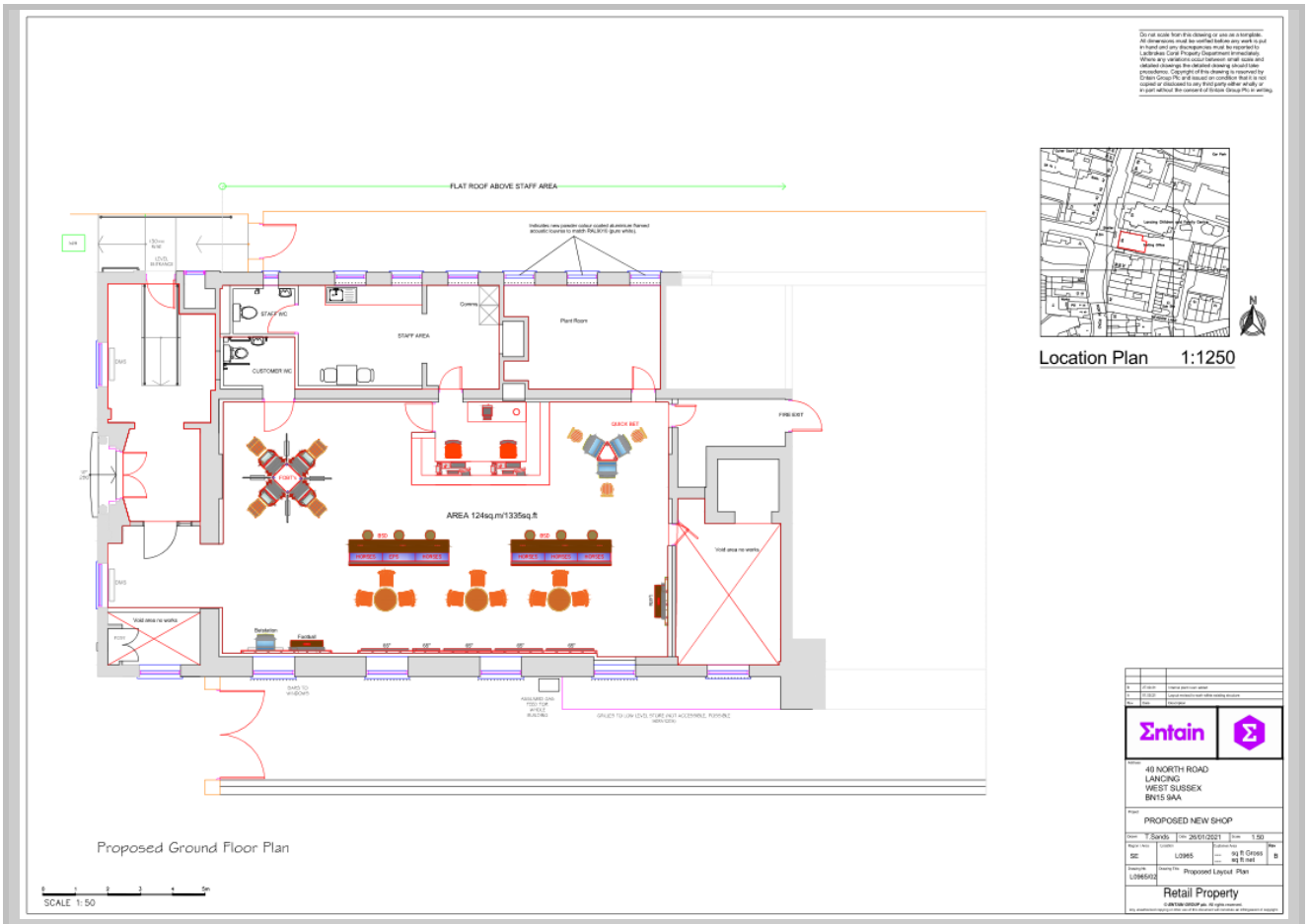
Residential Assessment Positions - Red

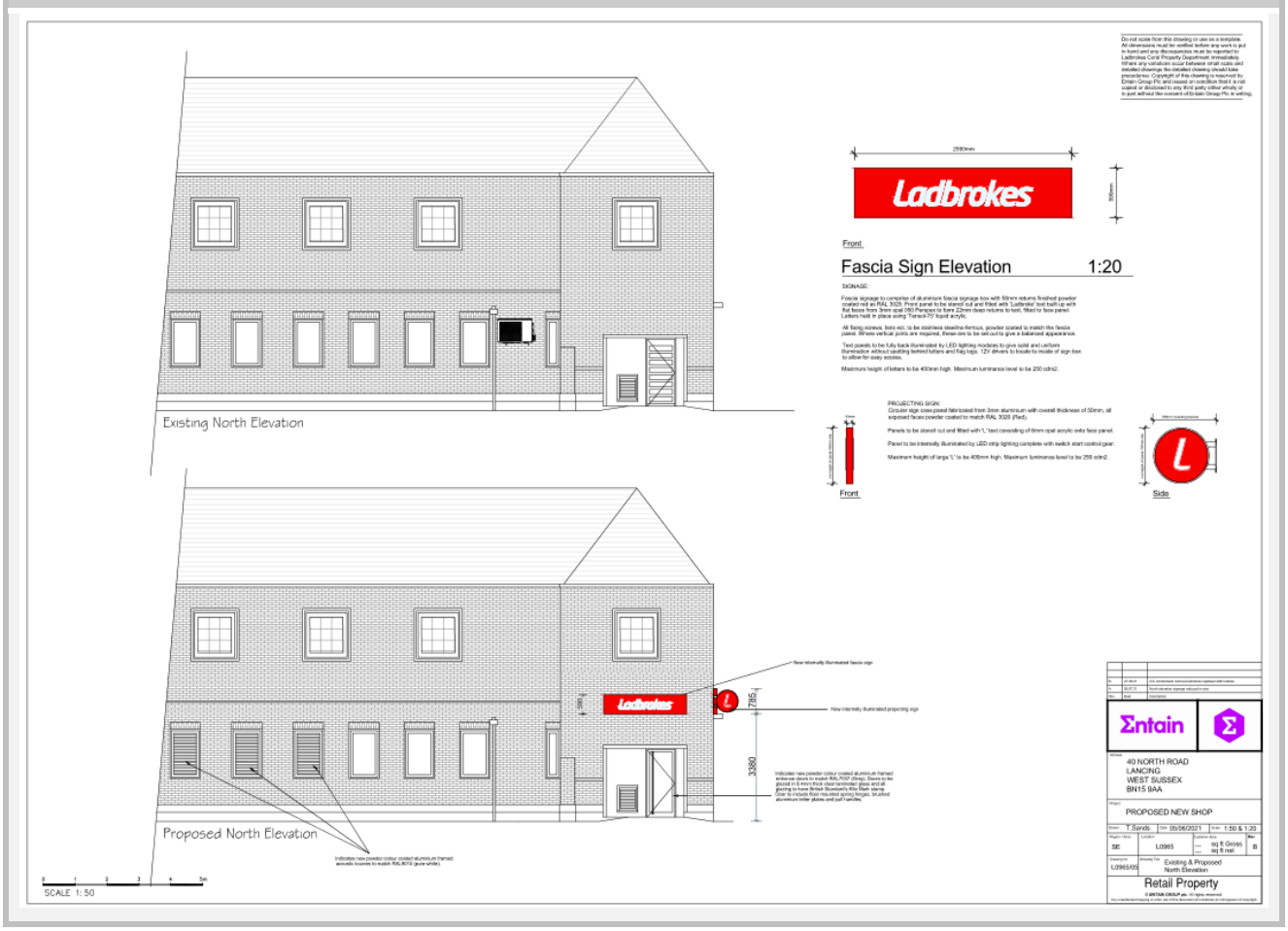
MEASUREMENT & ASSESSMENT POSITIONS

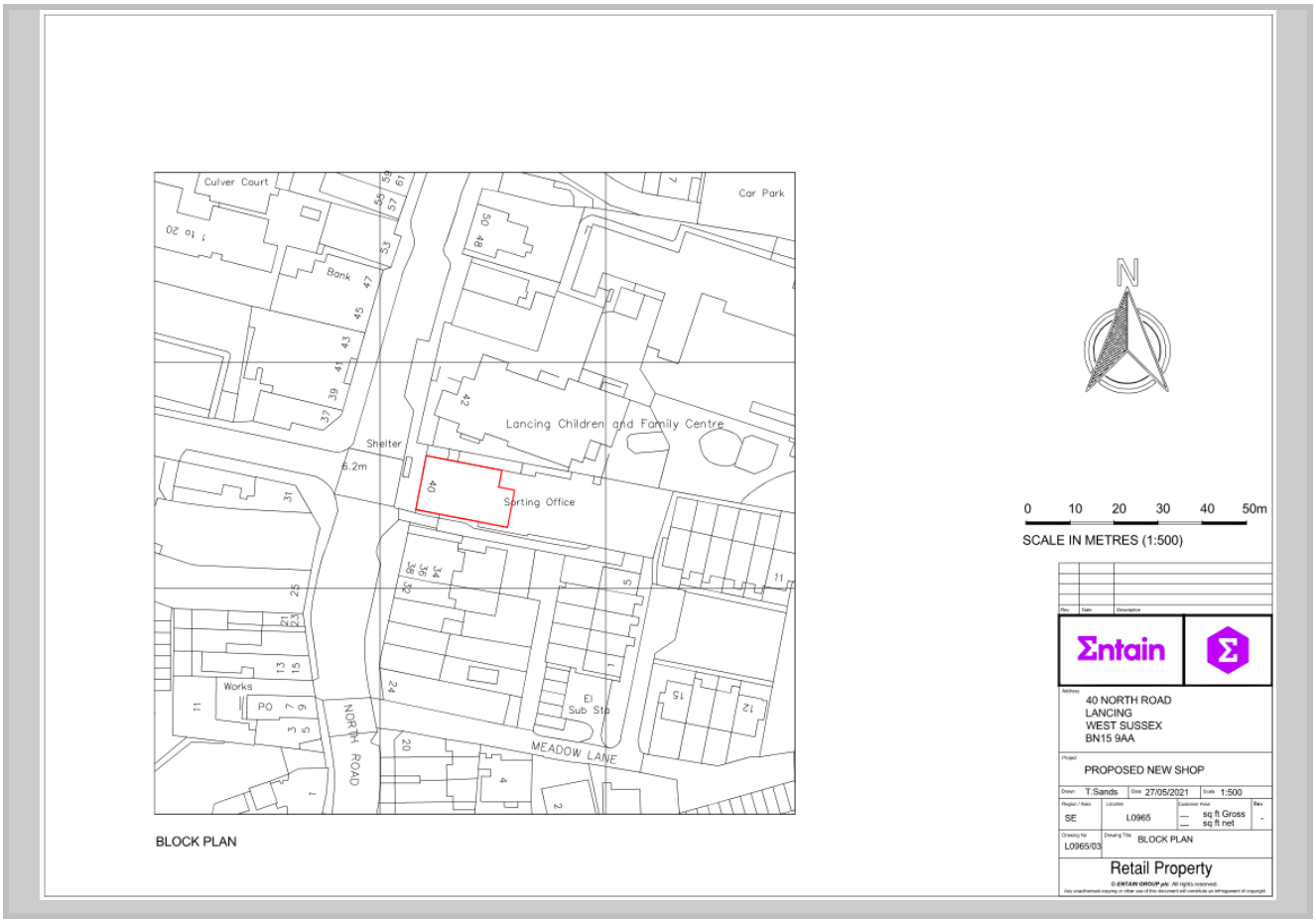
4 SITE LOCATION



4.1 Layout


FLAT ROOF ABOVE STAFF AREA
STAFF AREA
Plant Room
AREA 124sq.m/1335sq.ft
Void area no works
Proposed Ground Floor Plan
SCALE 1: 50
Location Plan 1:1250
Entain
49 NORTH ROAD
LANCING
WEST SUSSEX
BN15 9AA
PROPOSED NEW SHOP
T Sands
26/01/2021
1:50
SE
L0965
90 ft² Gross
sq ft net
L0965/02
Proposed Layout Plan
Retail Property


Existing North Elevation
Ladbrokes
Front
Fascia Sign Elevation 1:20
SIGNAGE:
PROJECTING SIGN:
Front
Side
Proposed North Elevation
SCALE 1: 50
Entain
49 NORTH ROAD
LANCING
WEST SUSSEX
BN15 9AA
PROPOSED NEW SHOP
T Sands
05/06/2021
1:50 & 1:20
SE
L0965
90 ft² Gross
sq ft net
L0965/05
Existing & Proposed
North Elevation
Retail Property



4.2 Assessment Position and Background Position

Continuous measurement was undertaken at the assessment position between 24th – 28th June 2021. Measurement was undertaken at the representative nearest noise sensitive premises / receptor in accordance with ISO1996 part 2: 2017.

5 BACKGROUND NOISE LEVELS

5.1 Summary of Report

Continuous background noise measurements were undertaken between 24th – 28th June 2021 at the assessment position 1. The day time background noise levels between 07:00 and 23:00 was found to be $L_{A90,1\ hour}$ 42 dB. The night time background noise levels between 23:00 and 07:00 was found to be $L_{A90,1\ hour}$ 27 dB.

Daytime Equivalent Existing Background Noise Levels 7 days (07:00 – 23:00)	Measured Levels at Assessment Position 1	$L_{A90,t}$ 42 dB
Night time Equivalent Existing Background Noise Levels 7 days (08:00 – 18:00)	Measured Levels at Assessment Position 1	$L_{A90,t}$ 27 dB

6 APPARATUS

6.1 Equipment Calibration

The equipment was calibrated using a sound pressure level of 114.0 dB at an octave band centre frequency of 1000Hz with reference to 2 x 10-5 Nm-2 before and after the tests and the equipment set to have no inaccuracy greater than 0.2 dB.

All the following equipment was calibrated in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS) on the following dates. Calibration schedules are implemented within Impact Acoustics Ltd in accordance with UKAS directive LAB 23.

6.2 Position 1

Description	Make	Type	Serial No.	Calibration Intervals	Last Calibrated	Next Due Calibration
Integrated Sound Level Meter	Norsonic	118	31471	2 YEARS	28.10.2019	28.10.2021
12.5mm Microphone (with windshield)	Norsonic	1225	57535	2 YEARS	28.10.2019	28.10.2021
Microphone Pre – Amplifier	Norsonic	1206	30687	2 YEARS	28.10.2019	28.10.2021

The noise meter was calibrated before and after the assessment period and found to be within the tolerance of the manufacturer's guidance. Full Calibration certificates are available upon request.

7 CALCULATIONS

7.1 Proposed Plant

The following plant is to be installed within the newly formed internal plant room on the northern elevation of the building and is to be vented through acoustic louvres mounted within the existing window apertures.

Proposed Plant	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1.0k	2.0k	4.0k	8.0k	
1 x RZASG100MY1	63	62	58	56	52	47	42	38	58
1 x RZASG140MY1	53	56	52	54	47	46	38	32	54
2 x RXM25N9	60	60	59	58	53	49	44	37	59

7.2 Hours of Operation

The proposed units are for the use of an air conditioning system within a commercial building that only operates during daytime hours and therefore the units will not operate during night time hours. Daytime assessments have been made for the proposed units.

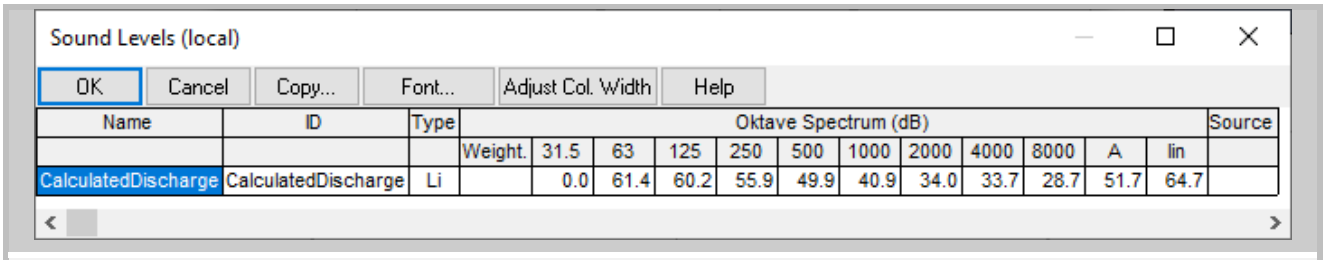
7.3 Calculated Noise Breakout

	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1.0k	2.0k	4.0k	8.0k	
RZASG100MY1	63	62	58	56	52	47	42	38	58
RZASG140MY1	53	56	52	54	47	46	38	32	54
RXM25N9	60	60	59	58	53	49	44	37	59
RXM25N9	60	60	59	58	53	49	44	37	59
Combined Internal Level	65.3	65.0	62.2	61.2	56.3	52.4	46.9	41.3	62
Acoustic Louvre	-5	-6	-8	-13	-17	-20	-15	-14	
Calculated Radiating Lw dB	61.4	60.2	55.9	49.9	40.9	34.0	33.7	28.7	52

7.4 Inputted Noise Levels

Based on the above calculations, the following noise levels have been inputted into the 3D Model CADNA A and include for all reflections from the buildings in place.

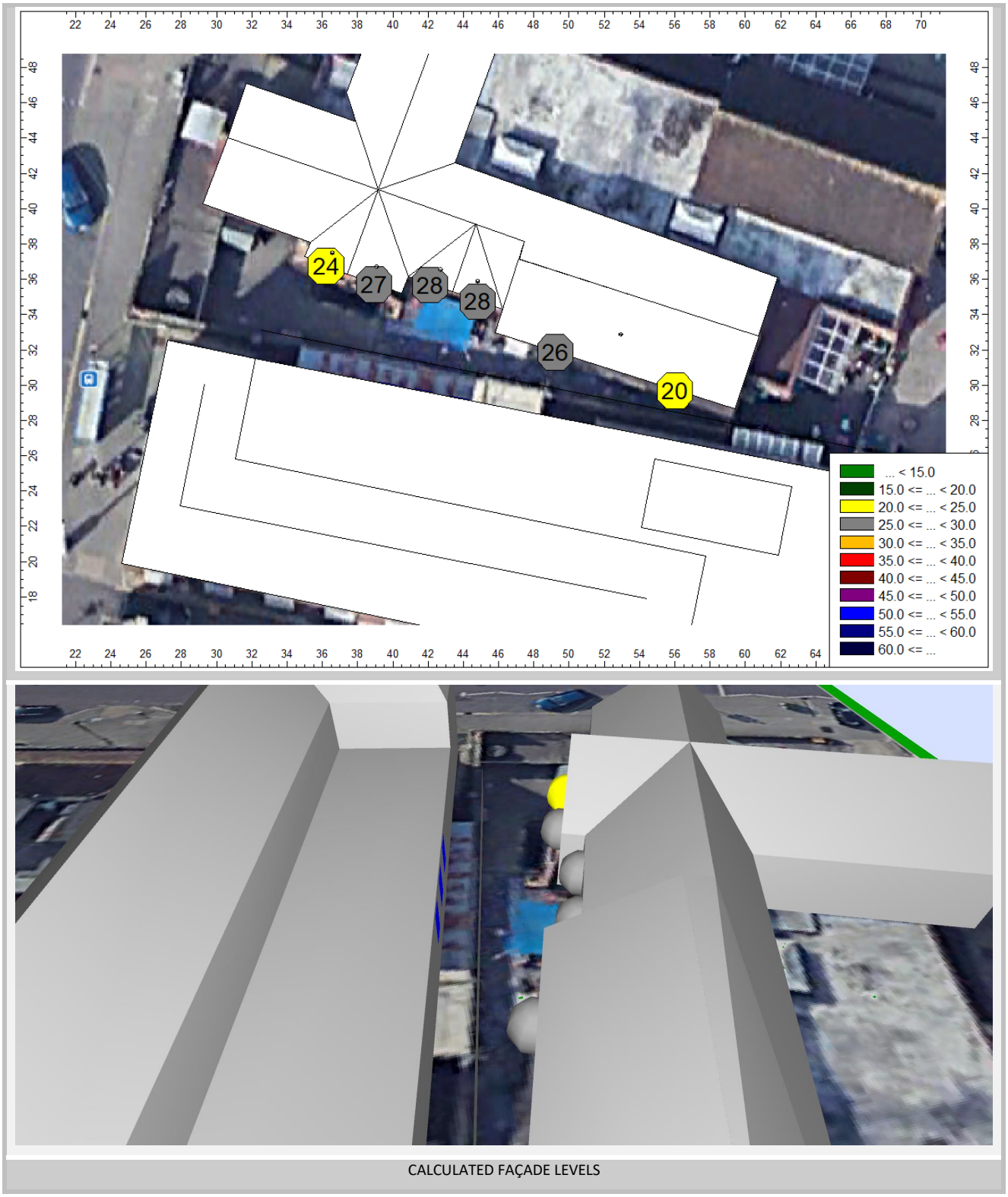
The above noise levels have been inputted into the 3D Model, as is illustrated below:-



INPUTTED NOISE LEVELS

7.5 Calculated Facade Noise levels

The above inputted noise levels have generated the following 3D Model.



CALCULATED FAÇADE LEVELS

Based on the above tabulated results, the aforementioned improvements are required and the following assessments have been made:-

8 BS4142: 2014 NOISE ASSESSMENT

8.1 Scope of British Standard 4142: 2014

In the assessment of the existing surrounding commercial premises, consideration has been given to the scope of British Standard 4142: 2014, which in section 1, details applicability of this standard to rating assessing sound of an industrial and/or commercial nature. It is considered appropriate that both the background noise levels and the rating noise levels obtained fall within the scope of British Standard 4142: 2014 by using outdoor sound levels to assess the effect of sound on local residents.

8.2 Terms and Definitions

Symbol	Term	Definition
AP	Assessment Position	Position externally at the façade property under investigation at which the assessment is undertaken which is usually 1m from the 1st floor bedroom window.
EP	Equivalent Position	Position at which the background noise levels are measured if there is no access to the assessment position or if source under investigation is audible.
$L_s = L_{Aeq,T}$	Specific Level	The average continuous equivalent sound pressure level of the source at the assessment position.
$L_{Ar,Tr}$	Rating Level	The average continuous equivalent sound pressure level of the source at the assessment position with a correction to account for the characteristic features.
$L_r = L_{Aeq,T}$	Residual Level	The average continuous equivalent sound pressure level at the assessment position without the source operating.
$L_{A90,T}$	Background Level	The sound pressure level that is not exceeded 90% of the time at the assessment position.
$L_a = L_{Aeq,T}$	Ambient Level	The totally encompassing sound at the assessment position including the residual and specific noise.

8.3 Assessment Position

The assessments were established as the properties facing the proposed air conditioning units.

8.4 Calculations

The specific noise levels are calculated at the assessment position located at the residential property above the site using the calculations detailed within ISO 9613 Part 1 and 2: 1996. These calculations take the manufacturers sound power levels into account for a variety of factors including source directivity, distance, atmospheric absorption, ground absorption and the effects of any barriers and determine the resultant noise levels at the assessment position.

8.5 Rating Levels (Character Correction)

It is appropriate to add a character correction where there is a new source that cannot be measured in line with BS4142: 2014. There are 3 methods for approaching this.

a) Subjective method
b) Objective method (for tonality)
c) Reference method

8.6 Subjective Method

The subjective method establishes a rating penalty that is added to the specific noise level if any of the following is present at the assessment position. If a tone is expected to be present a character correction of 0 dB to 6 dB is added depending on how perceptible it is at noise sensitive locations.

BS4142: 2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Tonality Ranging from not tonal to prominently tonal	Not tonal	+0
	Just perceptible	+2
	Clearly perceptible	+4
	Highly perceptible	+6

If the source is expected to be impulsive a character correction of 0 dB to 9 dB is added depending on how perceptible it is at noise sensitive locations.

BS4142: 2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Impulsivity Considering both the rapidity and any overall change in sound levels	Not impulsive	+0
	Just perceptible	+3
	Clearly perceptible	+6
	Highly perceptible	+9

When the sound features are neither tonal nor impulsive, a character correction of +3 is added for the readily distinctive quality against the acoustic environment or for the intermittency of the source.

BS4142: 2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Readily Distinctive	Is not present	+0
	Is present	+3
Intermittency	Is not present	+0
	Is present	+3

8.7 Assessment Criterion

The significance of the resulting noise on the residential property depends on the margin by which it exceeds the background noise levels. British Standard 4142: 2014 provides the following guidance within section 11.

Difference	Assessment of Impact
+10 dB	Indication of a significant adverse impact
+5 dB	Indication of an adverse impact
+0 dB	Indication of low impact

8.8 Noise Meter Floor

BS 4142: 2014 suggests that Care is necessary in circumstances where background sound levels are low to ensure that self-generated and electrical noise within the measurement system does not unduly influence reported values, which might be the case if the measured background sound levels are less than 10 dB above the noise floor of the measuring system. The floor of a typical class 1 noise meter is in the region of 14 dB(A) and therefore measurements of less than 24 dB(A) should be assessed with care.

8.9 BS 4142: 2014 Penalties

Whilst BS 4142: 2014 allows receptor assessments to be made to achieve levels equal to prevailing background noise levels, it also ensures that appropriate and more stringent penalties are applied to the specific noise level to ensure the correct level of protection for the local residents.

8.10 Assessments

8.10.1 Daytime 07:00 – 23:00 with acoustic screen

Rating Industrial Noise affecting Mixed Industrial and Residential Areas **British Standard 4142: 2014 Day Time (07:00 to 23:00)**			
Source	Operating Times		Source Position
	07:00 to 23:00 7 days per week Worst case scenario		See Plans
Assessment Position	40 NORTH ROAD, LANCING, BN15 9AA		
Background Position	At the assessment position		
Item	Calculation	Clause	Commentary
Specific Noise Level $L_{Aeq,1\ hour}$	28 dB	7	Calculated using ISO 9613:1996[3].
Tonal	+2 dB	8.1	Tonal Characteristic
Intermittency	+3 dB	8.1	Intermittency Characteristic
Rating Level	33 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\ hour}$	42 dB	8.1	Modal Background Noise Level (0700 – 2300)
Assessment Level	-9 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	**-9 dB**		
Conclusion	**The assessment level is 'Low Impact'**		

8.11 Tonal Penalty

A +2 dB penalty has been applied to the specific noise level to allow for any tonal impulsive elements that may be present from the proposed plant room.

8.12 Intermittency Penalty

A +3 dB penalty has been applied to the specific noise level to allow for any intermittent elements that may be present from the proposed plant room.

8.13 Assessment Conclusion

It can be seen from the above assessments that with the proposed new air conditioning units operational, an assessment conclusion of Low Impact could be expected during daytime periods.

9 NPPF & NPSE

The National Planning Policy Framework 2019 (NPPF) and assessments to the Noise Policy Statement for England 2010 (NPSE) should be made in conjunction with each other. Paragraphs 180 - 183 of the National Planning Policy Framework 2019 (NPPF) states the following:

Paragraph 180 Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.
b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

Paragraph 181 Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications.

Paragraph 182 Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

Paragraph 183 The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.

The Noise Policy Statement for England gives various levels of effect as detailed within this report.

With the proposed plant installed as detailed within this report, the development can be implemented within the guidelines of the aforementioned documents and ensure a conclusion of **NOEL – No Observed Effect Level.** This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

10 CONCLUSIONS

10.1 Summary of Report

Continuous background noise measurements were undertaken between 24th – 28th June 2021 at the assessment position 1. The day time background noise levels between 07:00 and 23:00 was found to be $L_{A90,1\ hour}$ 42 dB. The night time background noise levels between 23:00 and 07:00 was found to be $L_{A90,1\ hour}$ 27 dB.

Daytime Equivalent Existing Background Noise Levels 7 days (07:00 – 23:00)	Measured Levels at Assessment Position 1	$L_{A90,t}$ 42 dB
Night time Equivalent Existing Background Noise Levels 7 days (08:00 – 18:00)	Measured Levels at Assessment Position 1	$L_{A90,t}$ 27 dB

10.2 Proposed Plant

The following plant is to be installed on the flat roof section at the side of the building:-
The following plant is to be installed within the newly formed internal plant room on the northern elevation of the building and is to be vented through acoustic louvres mounted within the existing window apertures.

Proposed Plant	Octave Band Centre Frequency (Hz)								dB(A)
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1 x RZASG100MY1	63	62	58	56	52	47	42	38	58
1 x RZASG140MY1	53	56	52	54	47	46	38	32	54
2 x RXM25N9	60	60	59	58	53	49	44	37	59

10.3 Hours of Operation

The proposed units are for the use of an air conditioning system within a commercial building that only operates during daytime hours (08:00 – 22:00) and therefore the units will not operate during night time hours. Daytime assessments have been made for the proposed units.

10.4 Assessments

10.4.1 Daytime (07:00-23:00) with acoustic screen

Rating Level	33 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\ hour}$	42 dB	8.1	Modal Background Noise Level (0700 – 2300)
Assessment Level	-9 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	**-9 dB**		
Conclusion	**The assessment level is 'Low Impact'**		

10.5 Conclusions

The operation of the proposed air conditioning units has been assessed to establish if the development will have a demonstrable adverse effect in terms of noise that outweighs the benefits of the development. Measurements have been undertaken in accordance with British Standard 4142: 2014 and ISO 1996 – Part 2: 2017. This report has established the existing background noise levels at the closest noise sensitive facade to the proposed location and the assessment of the impact of the site operation on nearby properties. The resulting emissions from the plant running on a worst case scenario show no conflict with 'low impact' criteria and give a strong indication that complaints and impact on the local amenity is unlikely, provided the acoustic louvre is installed as detailed within this report.

It can be seen from the above assessments that with the proposed new air conditioning units operational, an assessment conclusion of Low Impact could be expected during daytime periods.

10.6 NPPF 2019

National Planning Policy Framework 2019 suggests that planning permission should be granted unless any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in the framework taken as a whole, or specific policies in the framework indicate the application should be restricted.

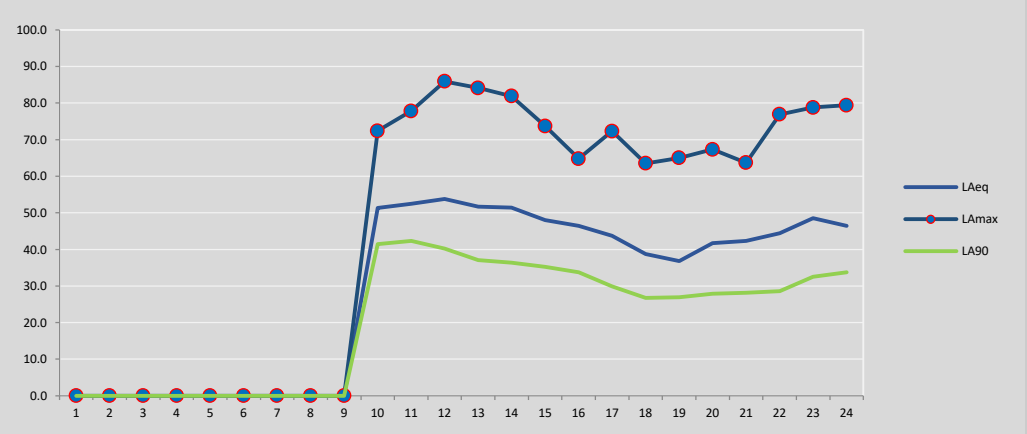
10.7 Planning Approval Recommendation

Based on the calculations and assessments made within this report it is the professional opinion of Impact Acoustics Ltd that the proposed air conditioning units can demonstrate compliance with the National Planning Policy Framework 2019, NPPF & NPSE and that, with regards to sound planning permission can be granted.

11 APPENDIX A – RESULTS

11.1 Position 1 – 24th – 25th June 2021

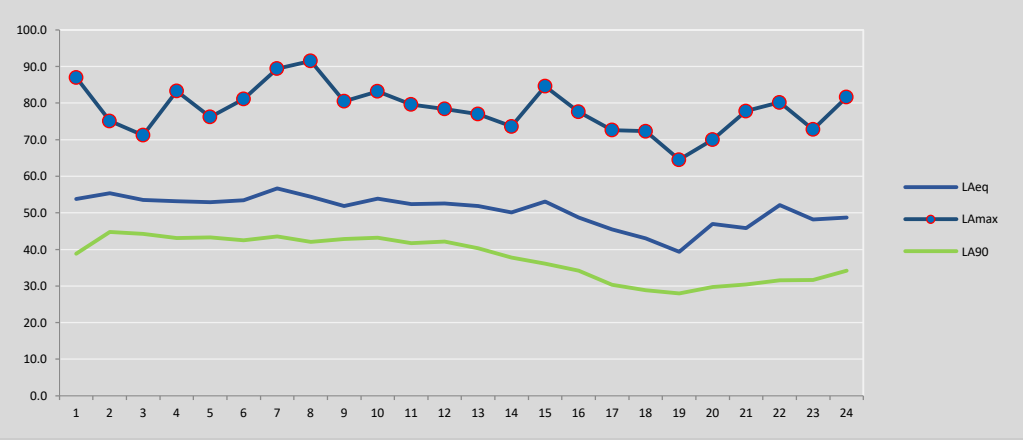
Time Period	L_{Max}	Minimum 15 minute		1 Hour		Day and Night	
		$L_{Aeq,15\ min}$	$L_{A90,\ 15\ min}$	$L_{Aeq,\ 1\ hour}$	$L_{A90,\ 1\ hour}$	$L_{Aeq,\ t}$	$L_{A90,\ 16hours}$
07:00 – 08:00	0.0	0.0	0.0	0.0	0.0	47.7	35.5
08:00 – 09:00	0.0	0.0	0.0	0.0	0.0		
09:00 – 10:00	0.0	0.0	0.0	0.0	0.0		
10:00 – 11:00	0.0	0.0	0.0	0.0	0.0		
11:00 – 12:00	0.0	0.0	0.0	0.0	0.0		
12:00 – 13:00	0.0	0.0	0.0	0.0	0.0		
13:00 – 14:00	0.0	0.0	0.0	0.0	0.0		
14:00 – 15:00	0.0	0.0	0.0	0.0	0.0		
15:00 – 16:00	0.0	0.0	0.0	0.0	0.0		
16:00 – 17:00	72.4	51.6	41.7	51.3	41.4		
17:00 – 18:00	77.8	51.1	41.6	52.5	42.4		
18:00 – 19:00	85.9	51.5	38.6	53.8	40.2		
19:00 – 20:00	84.1	49.4	36.4	51.7	37.1		
20:00 – 21:00	81.9	48.3	35.9	51.4	36.3		
21:00 – 22:00	73.7	46.9	34.7	48.0	35.2		
22:00 – 23:00	64.8	44.8	33.2	46.5	33.8		
23:00 – 00:00	72.3	41.1	27.8	43.7	29.9	45.3	31.1
00:00 – 01:00	63.5	37.4	26.5	38.7	26.8		
01:00 – 02:00	65.0	29.7	26.8	36.8	27.0		
02:00 – 03:00	67.3	36.6	26.6	41.7	27.8		
03:00 – 04:00	63.7	39.5	27.0	42.3	28.2		
04:00 – 05:00	76.9	41.1	27.7	44.4	28.6		
05:00 – 06:00	78.8	46.8	29.6	48.5	32.5		
06:00 – 07:00	79.4	47.8	33.0	46.5	33.8		



Sound Pressure Levels, dB. Reference level of 2 x 10^{-5} Nm^{-2}

11.2 Position 1 – 25th – 26th June 2021

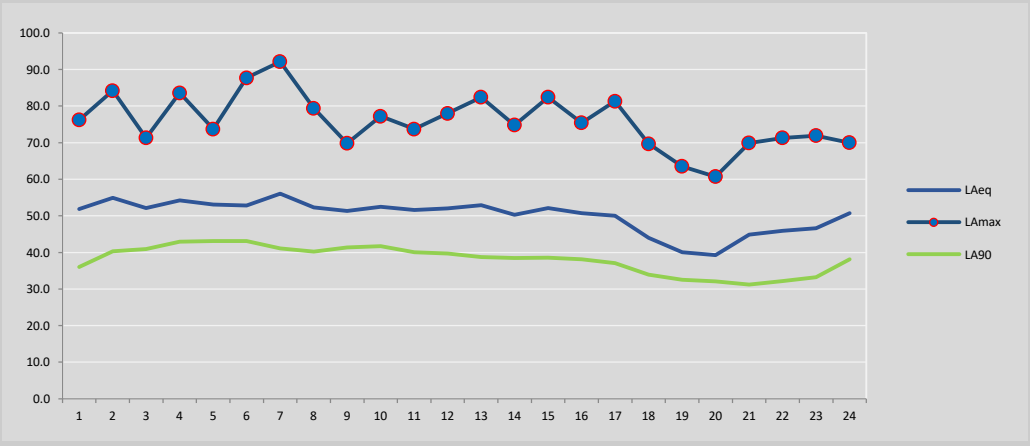
Time	L_{Max}	Minimum 15 minute		1 Hour		Day and Night	
Period		$L_{Aeq,15\ min}$	$L_{A90,\ 15\ min}$	$L_{Aeq,\ 1\ hour}$	$L_{A90,\ 1\ hour}$	$L_{Aeq,\ t}$	$L_{A90,\ 16hours}$
07:00 – 08:00	87.0	51.2	37.4	53.8	38.8	53.3	42.1
08:00 – 09:00	75.1	54.2	42.3	55.4	44.7		
09:00 – 10:00	71.2	52.5	41.7	53.5	44.3		
10:00 – 11:00	83.3	52.2	40.9	53.2	43.1		
11:00 – 12:00	76.2	52.2	41.8	52.9	43.3		
12:00 – 13:00	81.1	51.4	41.4	53.5	42.5		
13:00 – 14:00	89.4	53.0	42.6	56.7	43.6		
14:00 – 15:00	91.5	50.7	39.4	54.4	42.1		
15:00 – 16:00	80.5	50.6	41.2	51.9	42.9		
16:00 – 17:00	83.2	51.4	41.9	53.8	43.2		
17:00 – 18:00	79.6	51.6	41.1	52.3	41.7		
18:00 – 19:00	78.4	51.0	41.7	52.5	42.2		
19:00 – 20:00	77.0	50.6	38.5	51.9	40.3		
20:00 – 21:00	73.6	49.9	36.5	50.1	37.8		
21:00 – 22:00	84.6	48.7	35.5	53.1	36.1		
22:00 – 23:00	77.6	46.4	33.5	48.7	34.2		
23:00 – 00:00	72.6	42.0	29.6	45.4	30.3	47.7	30.6
00:00 – 01:00	72.3	40.1	28.6	43.0	28.8		
01:00 – 02:00	64.5	35.5	27.6	39.3	28.0		
02:00 – 03:00	70.0	41.3	27.8	47.0	29.7		
03:00 – 04:00	77.8	41.0	30.1	45.9	30.4		
04:00 – 05:00	80.2	42.3	30.5	52.2	31.5		
05:00 – 06:00	72.8	43.1	30.9	48.2	31.7		
06:00 – 07:00	81.6	44.7	31.4	48.7	34.2		



Sound Pressure Levels, dB. Reference level of 2×10^{-5} Nm^{-2}

11.3 Position 1 – 26th – 27th June 2021

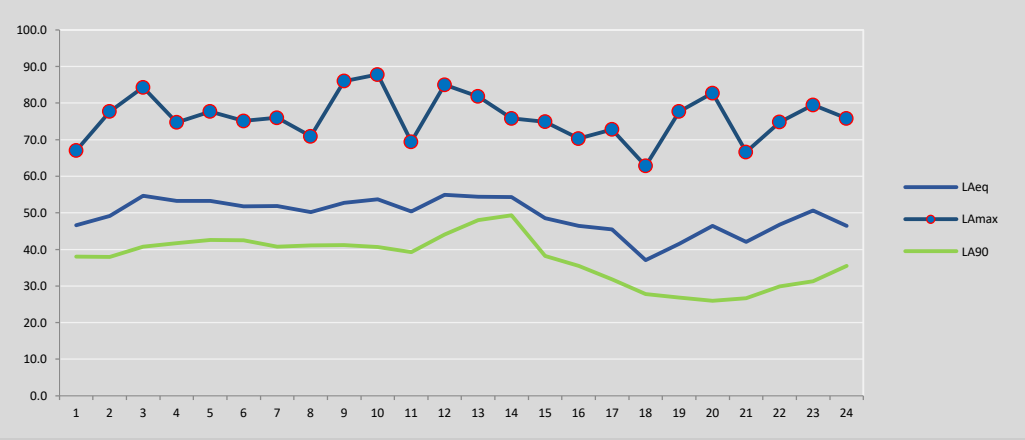
Time	L_{Max}	Minimum 15 minute		1 Hour		Day and Night	
Period		$L_{Aeq,15\ min}$	$L_{A90,\ 15\ min}$	$L_{Aeq,\ 1\ hour}$	$L_{A90,\ 1\ hour}$	$L_{Aeq,\ t}$	$L_{A90,\ 16hours}$
07:00 – 08:00	76.2	47.1	34.2	51.9	36.0	52.8	40.7
08:00 – 09:00	84.2	51.9	37.4	54.9	40.3		
09:00 – 10:00	71.3	51.3	39.2	52.1	40.9		
10:00 – 11:00	83.6	52.4	42.3	54.2	42.9		
11:00 – 12:00	73.7	52.0	41.2	53.1	43.1		
12:00 – 13:00	87.7	50.2	41.5	52.8	43.2		
13:00 – 14:00	92.1	52.8	40.8	56.1	41.1		
14:00 – 15:00	79.4	50.7	39.4	52.3	40.2		
15:00 – 16:00	69.8	50.7	40.3	51.3	41.4		
16:00 – 17:00	77.2	50.4	40.1	52.4	41.7		
17:00 – 18:00	73.7	50.4	38.3	51.6	40.0		
18:00 – 19:00	78.0	50.4	38.6	52.0	39.7		
19:00 – 20:00	82.4	49.2	37.7	52.9	38.7		
20:00 – 21:00	74.8	46.8	37.9	50.3	38.5		
21:00 – 22:00	82.4	49.6	38.3	52.1	38.5		
22:00 – 23:00	75.4	47.5	37.5	50.7	38.1		
23:00 – 00:00	81.3	47.5	35.7	50.0	37.1	45.9	34.0
00:00 – 01:00	69.7	42.7	33.1	44.0	33.9		
01:00 – 02:00	63.5	38.5	31.6	40.0	32.5		
02:00 – 03:00	60.7	38.4	31.2	39.3	32.1		
03:00 – 04:00	69.9	37.1	30.8	44.9	31.2		
04:00 – 05:00	71.3	39.2	30.3	45.9	32.1		
05:00 – 06:00	71.9	40.9	32.9	46.6	33.3		
06:00 – 07:00	70.0	41.3	34.7	50.7	38.1		



Sound Pressure Levels, dB. Reference level of 2×10^{-5} Nm^{-2}

11.4 Position 1 – 27th – 28th June 2021

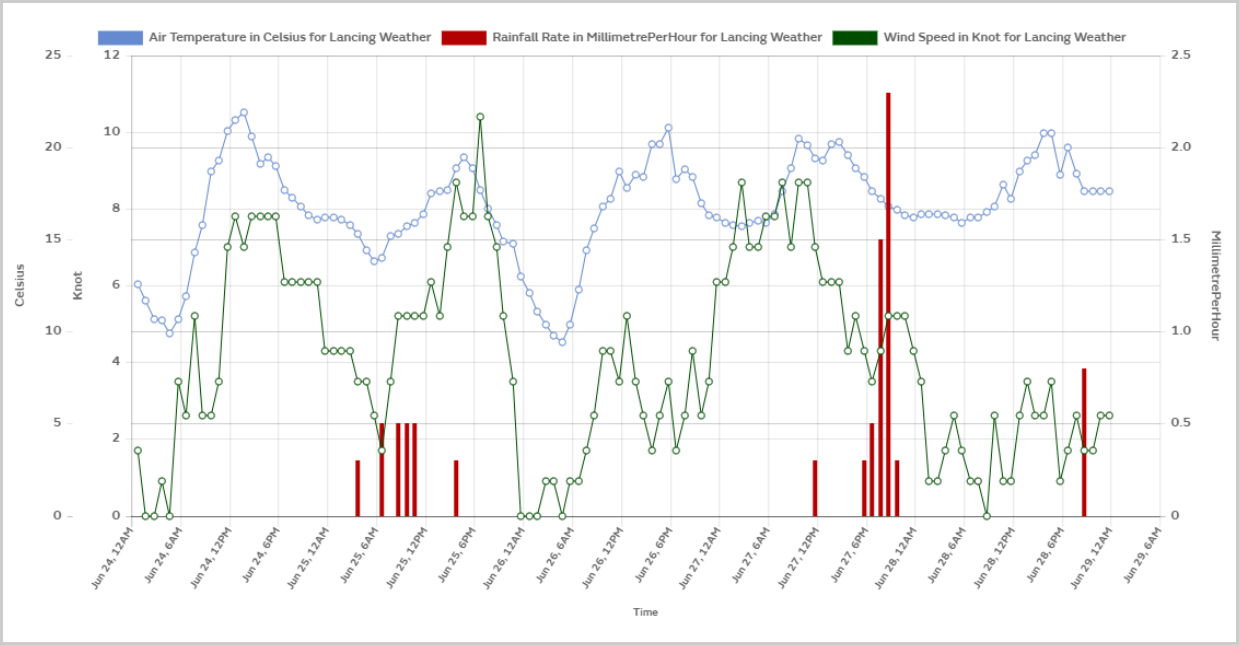
Time	L_{Max}	Minimum 15 minute		1 Hour		Day and Night	
Period		$L_{Aeq,15\ min}$	$L_{A90,\ 15\ min}$	$L_{Aeq,\ 1\ hour}$	$L_{A90,\ 1\ hour}$	$L_{Aeq,\ t}$	$L_{A90,\ 16hours}$
07:00 – 08:00	67.0	45.4	37.3	46.6	38.1	52.4	43.0
08:00 – 09:00	77.7	43.1	37.3	49.2	38.0		
09:00 – 10:00	84.3	50.3	38.8	54.6	40.7		
10:00 – 11:00	74.7	49.8	40.6	53.3	41.7		
11:00 – 12:00	77.7	51.1	41.8	53.2	42.6		
12:00 – 13:00	75.1	50.7	41.8	51.8	42.5		
13:00 – 14:00	76.0	50.7	40.0	51.9	40.8		
14:00 – 15:00	70.9	49.1	40.0	50.2	41.1		
15:00 – 16:00	86.0	51.5	39.6	52.7	41.2		
16:00 – 17:00	87.8	50.5	40.0	53.7	40.7		
17:00 – 18:00	69.4	49.7	38.9	50.3	39.3		
18:00 – 19:00	85.0	51.7	41.0	54.9	44.1		
19:00 – 20:00	81.8	52.7	45.6	54.4	48.0		
20:00 – 21:00	75.8	50.5	41.5	54.3	49.3		
21:00 – 22:00	74.9	45.5	35.8	48.5	38.2		
22:00 – 23:00	70.3	45.3	33.9	46.4	35.5		
23:00 – 00:00	72.8	42.9	30.5	45.4	31.9	47.2	30.1
00:00 – 01:00	62.8	31.2	27.1	37.1	27.8		
01:00 – 02:00	77.7	32.3	26.6	41.5	26.8		
02:00 – 03:00	82.7	32.3	25.9	46.4	26.0		
03:00 – 04:00	66.6	40.9	25.4	42.1	26.7		
04:00 – 05:00	74.8	45.9	28.1	46.8	29.9		
05:00 – 06:00	79.5	44.5	30.8	50.6	31.3		
06:00 – 07:00	75.8	47.5	31.0	46.4	35.5		



Sound Pressure Levels, dB. Reference level of 2 x 10^{-5} Nm^{-2}

12 APPENDIX B – WEATHER CONDITIONS

12.1 24th – 28th June 2021



24th – 28th June 2021

END OF REPORT