



Discharge of Condition

Site Address: 5-7 Byrom Street, Manchester, M3 4PF

Client Name: T A Knox Limited

Project Reference No: NP-013784



Authorisation and Version Control

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Delivering sustainable development by promoting good health and well-being through effective management of noise.

Contents

1.	INTRODUCTION	4
1.1	Standards, Legislation, Policy & Guidance	4
1.2	Proposal Brief	5
1.3	Local Planning Authority & Background	5
2.	ENVIRONMENTAL NOISE SURVEY	7
2.1	Measurement Methodology	7
2.2	Context & Subjective Impression.....	7
2.3	Environmental Noise Survey Results.....	8
2.4	Receptor Measurement Results Summary	8
3.	EXTERNAL PLANT NOISE IMPACT ASSESSMENT	9
3.1	Office Assessment – NSR2	9
4.	CONCLUSION AND ACTION PLAN	10
	APPENDIX A – ACOUSTIC TERMINOLOGY	11
	APPENDIX B – STANDARDS, LEGISLATION, POLICY, AND GUIDANCE	12
	B.1 – National Planning Policy Framework (2023)	12
	B.2 – Noise Policy Statement for England (2010).....	12
	B.3 – BS4142:2014+A1:2019 – ‘Methods for rating and assessing industrial and commercial sound’	14
	APPENDIX C – LOCATION PLANS	17
	APPENDIX D – ENVIRONMENTAL SURVEY	18
	D.1 – Time History Noise Data	18
	D.2 – Surveying Equipment	18
	D.3 – Meteorological Conditions	19
	APPENDIX E – MANUFACTURER DATASHEETS	20
	APPENDIX F – FULL CALCULATIONS	21

List of Figures

<i>Figure 1 – Proposed Development.....</i>	<i>5</i>
<i>Figure 2 – Measurement Locations and Site Surroundings.....</i>	<i>7</i>
<i>Figure 3 – MP1 Daytime Operational Hours Background Sound Level Analysis.....</i>	<i>8</i>
<i>Figure 4 – MP1 Noise Survey Time History.....</i>	<i>18</i>

List of Tables

<i>Table 1 – Measurement Methodology</i>	<i>7</i>
<i>Table 2 – Calculated Specific Sound Levels at Source</i>	<i>8</i>
<i>Table 3 – Calculations & BS4142 Noise Impact Assessment.....</i>	<i>9</i>
<i>Table 4 – Surveying Equipment.....</i>	<i>18</i>
<i>Table 5 – Weather Conditions.....</i>	<i>19</i>

1. Introduction

NOVA Acoustics Ltd has been commissioned to provide evidence that Condition 5 placed on the proposed development by Manchester City Council can be discharged. These conditions relate to planning application No. 139981/FO/2024 ('the application') which contained proposals for general refurbishment works ('the proposed development') at 5-7 Byrom Street, Manchester, M3 4PF ('the site').

A noise survey has been undertaken to establish the prevailing background sound levels at the closest Noise Sensitive Receptors ('NSRs'). The report details the existing background sound climate and provides a plant noise limit level for the noise emissions associated with the proposed development.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.1 Standards, Legislation, Policy & Guidance

The following performance standards, legislation, policy and guidance have been considered to ensure good acoustic design in the assessment:

- The LPA conditional approval; specifically, 'Condition 5'.
- The LPA technical guidance, specifically; Manchester City Council's guidance document 'Planning and Noise Technical Guidance' (2022).
- National Planning Policy Framework (2023).
- Noise Policy Statement for England (2010).
- British Standard BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'.
- British Standard BS8233:2014 – 'Guidance on sound insulation and noise reduction for buildings'.

Further information on the legislation can be found in Appendix B.

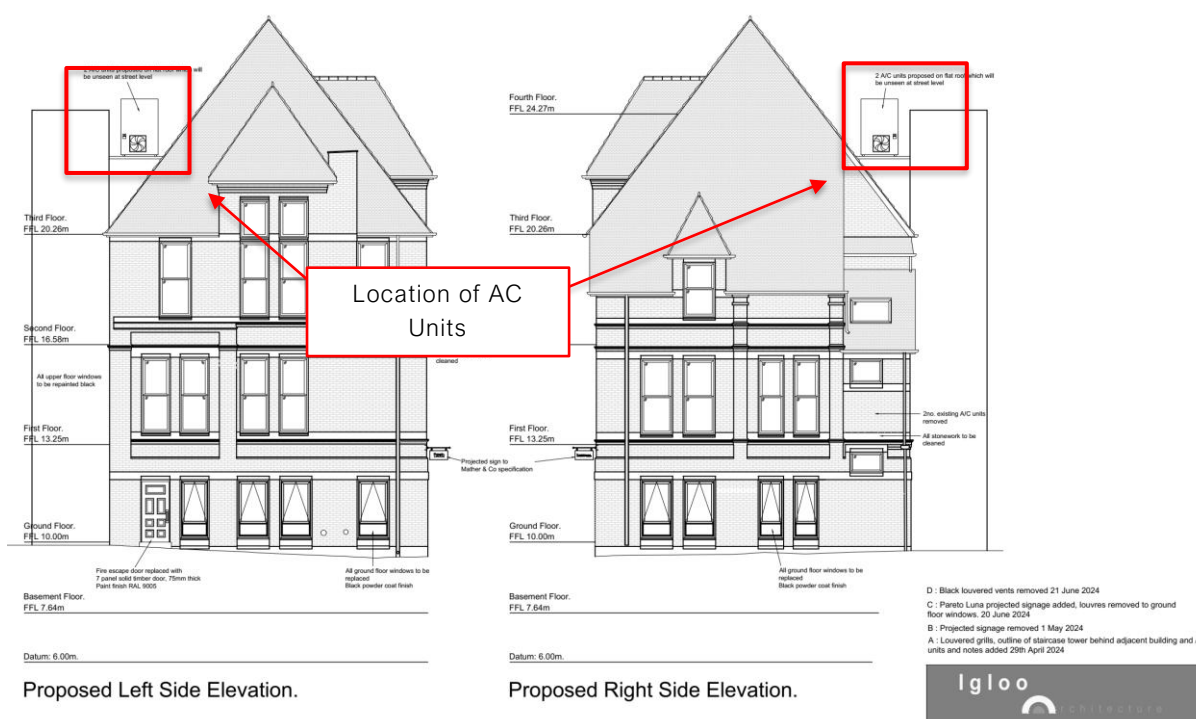
1.2 Proposal Brief

The general proposals for the site included for external alterations comprising the installation of new double doors, replacement windows with louvres and the relocation of air conditioning ('AC') units.

The following items of plant were installed at the development:

- 2no. Mitsubishi PURY-P900YSNW-A (-BS)

The plant operates from 09:00 to 17:00, Monday to Friday. The figure below shows the development and the location of the plant items. Manufacturer datasheets are provided in Appendix E for reference.



Drawing Ref No. P1276/18 from 'Igloo'

Figure 1 – Proposed Development

1.3 Local Planning Authority & Background

The following planning condition imposed on the application by the LPA requires discharging:

"5) a) Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (LA_{90}) level at the nearest noise sensitive location. a) Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.

b) Prior to the operation of the scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The

report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site pursuant to policies DM1 and SP1 of the Manchester Core Strategy (2012)."

Nova Acoustics have previously submitted a document for the discharging of condition 5 (Ref: NP-011858 – NIA for Discharge of Condition – NOVA Acoustics Ltd) in which onsite measurements of the plant units were conducted to determine the in situ noise levels of the proposed plant and the impact on nearby receptors.

Since this submission, the LPA have responded with refusal to discharge the condition, with the following response:

"Condition 5(Acoustic) cannot yet be discharged as insufficient information has been provided. The following is outstanding:

It has been confirmed that the criteria has been met at the residential / hotel receptor. However, the assessment has found that the noise level at the neighbouring commercial building is 62dB and far in excess of the criteria and well above the measured background noise level used in the assessment of 50dB. The criteria still needs to be met at the commercial receptor as the intention of the condition is also to prevent a general increase in noise in the area so we cannot discharge the condition until mitigation measures have been recommended and implemented to control the noise level.

We can possibly look to agree a relaxed criteria of equal to background as a means of compromise in this instance but we wouldn't be able to discharge the condition or approve the plant operating above the background noise level.

We will need a scheme of mitigation recommending with an updated assessment to demonstrate that the proposed mitigation is sufficient to reduce the noise level at the receptor in line with at least the above relaxed criteria. Once agreed and installed, an updated validation assessment will be required to confirm the mitigation measures have been implemented and the noise level has been controlled to not exceed the LA90 at the commercial receptor."

A previously issued report (Ref: NP-011858 – NIA for Discharge of Condition – NOVA Acoustics Ltd) previously demonstrated that the criteria was met at the nearest residential receptors to the proposed development. However, works were required to reduce noise breakout to the nearest offices.

It is understood that mitigations measures have been applied to the plant to reduce its overall duty, and as such, Nova Acoustics have revisited site to undertake further measurements of the plant units and updated the assessment accordingly.

2. Environmental Noise Survey

2.1 Measurement Methodology

Unattended and attended noise monitoring was undertaken at the site to measure the background sound levels at the NSR's and measure the noise levels from the proposed items of plant.

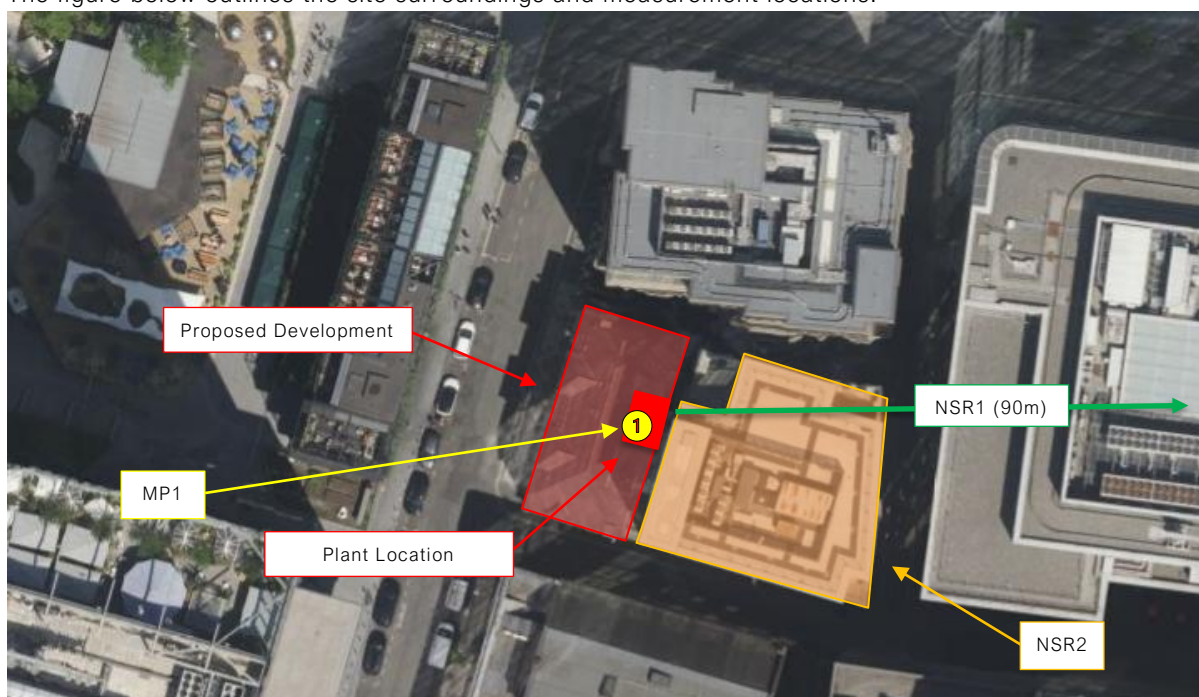
The unattended monitoring was undertaken at measurement position (MP) 1 in a location that was deemed representative of the noise climate at all NSR's. The plant items were switched off during this. Spot measurements were also carried out in proximity to the plant items with them switched on and off.

The following table outlines the measurement dates and particulars. Weather conditions during the environmental sound survey can be found in Appendix D.

Location	Survey Dates	Measurement Particulars
MP1	30-31/10/2024	Equipment mounted on a tripod at 3m above rooftop level in a free-field monitoring location. A 130mm diameter windshield was fitted to the microphone. The equipment was field calibrated before and after the survey; negligible drift was noted.

Table 1 – Measurement Methodology

The figure below outlines the site surroundings and measurement locations:



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Figure 2 – Measurement Locations and Site Surroundings

2.2 Context & Subjective Impression

The plant is installed on the rooftop rear side (eastern) of the building.

The noise profile in the area is considered high and is dominated by road traffic noise from the surrounding road networks.

The nearest *residential* receptor to the site is at the Moxy Manchester City hotel (NSR1) situated approximately 90m away to the east. The nearest non-residential receptors to the plant are the office buildings immediately to the east (NSR2), approximately 5m away.

2.3 Environmental Noise Survey Results

Background Sound Level Analysis

The following section outlines the measured background sound levels that have been used as the baseline for the subsequent BS4142 noise assessment.

The figure below shows a histogram graph of the background sound levels measured during the proposed operational period of 09:00 – 17:00 hours throughout the entire measurement period. The time history results can be found in Appendix D. The below noise levels were recorded with the plant items switched off throughout the measurement duration.

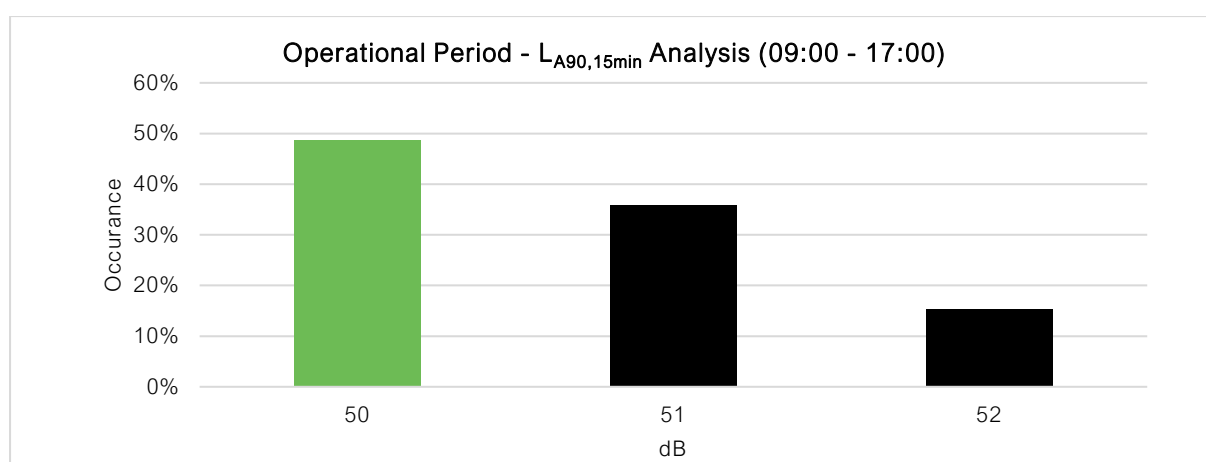


Figure 3 – MP1 Daytime Operational Hours Background Sound Level Analysis

As can be seen in Figure 3, the modal $L_{A90,15min}$ measurement of 50 dB has been used as the baseline for the daytime BS4142 assessments.

2.4 Receptor Measurement Results Summary

Measurements were carried out at 1m from the proposed items of plant on 22 January 2026. The plant has been set to a permanently reduced capacity (70%), and it is understood that this will be maintained for the lifetime of the equipment.

Ambient measurements were conducted with both items of plant operating. At 1m distance from the equipment, the prevailing noise climate was inaudible and so there has been no correction for residual noise. This is deemed a robust assessment approach. A summary of the specific noise levels is presented below.

Location	Description	Octave Band (Hz, L_{eq} dB)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
MP1	Specific Sound Level (1m)	71	66	62	59	55	52	49	53	62

Table 2 – Calculated Specific Sound Levels at Source

3. External Plant Noise Impact Assessment

There are two types of NSR to the rooftop items of plant: the residential building 90m away to the east (NSR1), and the nearby office buildings 5m to the east (NSR2). The previously issued report (Ref: NP-011858 – NIA for Discharge of Condition – NOVA Acoustics Ltd) previously demonstrated that the criteria was met at NSR1. An assessment to NSR2 of the plant following mitigation is presented below.

3.1 Office Assessment – NSR2

Based on the requirements of Condition 5 and the feedback from the LPA, the rating level from any items of fixed mechanical plant should not exceed the background sound level at the receptor. This would be based on the modal background sound level of 50 dB $L_{A90,T}$.

The calculations and BS4142 noise impact assessment at NSR2 is presented in the table below. Full calculations are shown in Appendix F.

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Installed Plant (L_w)	79	74	70	67	63	60	57	61	70
On-Time Correction	0 (continuous)								--
Propagation Loss to NSR2	-22 (5m – Q2)								--
Specific Sound Level at NSR2	57	52	48	45	41	38	35	39	48
Acoustic Feature Correction	No observed characterful features were observed during the measurement of the equipment, however for robustness, a +2 dB correction for 'just perceivable' tonality has been applied.								+2
Rating Sound Level ($L_{A,r,T,r}$)	Specific Sound Level + Rating Penalties								50
Background Sound Level	MP1 $L_{A90,15min}$ – Figure 3.								50
Exceedance	$L_{A,r,T,r} - L_{A90,15min}$								+0

Table 3 – Calculations & BS4142 Noise Impact Assessment

Based on the above, a rating level of 50dB $L_{A,r,T,r}$ would be determined at NSR2 which does not exceed the background sound level of 50 dB $L_{A90,T}$. Therefore, the requirements have been met.

4. Conclusion and Action Plan

The proposed development has been assessed against the requirements of Condition 5 placed on the scheme by the LPA, and the guidance documents presented in Section 1.1.

In summary, the noise impact assessment has included the following:

1. A noise impact assessment has been completed to the nearest receptors to the rooftop external plant.
2. In summary, the BS4142 rating sound level would not exceed the relaxed criterion at the nearest commercial receptor specified by the LPA, and Condition 5 can be effectively discharged without any mitigation measures.

The findings of this report will require written approval from the Local Authority prior to work commencing.

Appendix A – Acoustic Terminology

A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure given by the following formula in decibels (dBA). $L_{pA} = 10 \log_{10} (pA/p_0)^2$. Where: pA is the A-weighted sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)
Background Sound	Underlying level of sound over a period, T , which might in part be an indication of relative quietness at a given location
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T , has the same mean-squared sound pressure as the sound under consideration that varies with time
Facade level	Sound pressure level 1m in front of the facade
Free-field level	Sound pressure level away from reflecting surfaces
Noise Criteria	Numerical indices used to define design goals in a given space
Noise Rating (NR)	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves
Octave Band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit
Percentile Level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting “F”, which is exceeded for $N\%$ of a specified time interval
Rating Level, $L_{Ar,Tr}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise
Sound Pressure, p	root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound
Sound Pressure Level, L_p	Quantity of sound pressure, in decibels (dB), given by the formula: $L_p = 10 \log_{10} (p/p_0)^2$. Where: p is the root-mean-square sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)

Appendix B – Standards, Legislation, Policy, and Guidance

This report is to be primarily based on the following standards, legislation, policy and guidance.

B.1 – National Planning Policy Framework (2023)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2023. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 180e, it states:

Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

Paragraph 191 states:

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

- a) Mitigate and reduce to a minimum potential adverse impact 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; and*
- c) Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 191 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- 1) Avoid significant adverse impacts on health and quality of life.
- 2) Mitigate and minimise adverse impacts on health and quality of life.
- 3) Where possible, contribute to the improvement of health and quality of life.

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that *“significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development”*.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim refers to the situation where impact lies somewhere between LOAEL and SOAEL and requires that: *“all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.”*

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. This can be related to the third aim above, which seeks: *“where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim”*.

This is further expanded using the updated “Noise Exposure Hierarchy Table” which includes an additional level of impact referred to as the ‘No Observed Adverse Effect Level’ (‘NOAEL’). It is stated that at this level: *“noise can be heard, but does not cause any change in behaviour, attitude or other physiological response”*. In addition, noise at this level *“can slightly affect the acoustic character of the area but not such that there is a change in the quality of life”*.

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognising the constraints of the site.

B.3 – BS4142:2014+A1:2019 – ‘Methods for rating and assessing industrial and commercial sound’

Overview

BS4142 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ ‘specific sound level’, immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{A,r,T}$ ‘rating sound level’. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

Rating Penalty

Section 9 of BS4142 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142 states:

“Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:

- a) subjective method;*
- b) objective method for tonality;*
- c) reference method.”*

Due to the nature of the development the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142, which states:

“Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources.”

BS4142 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

- a) Tonality*

A rating penalty of +2dB is applicable for a tone which is “just perceptible”, +4dB where a tone is “clearly perceptible”, and +6dB where a tone is “highly perceptible”.

b) Impulsivity

A rating penalty of +3dB is applicable for impulsivity which is “just perceptible”, +6dB where it is “clearly perceptible”, and +9dB where it is “highly perceptible”.

c) Other Sound Characteristics

BS4142 states that where “the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3dB can be applied.”

d) Intermittency

BS4142 states that when the “specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time ... if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3dB can be applied.”

Background Sound Level

The background sound level is the underlying level of sound over a period, T, and is indicative of the relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a ‘typical’ background sound level for a given period. The purpose has not been to simply select the lowest measured value. Diurnal patterns have also been considered as they can have a major influence on background sound levels, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night time period for sleep purposes.

Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.

Assessment of Impact

BS4142 states: “*The significance of sound of 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 the context in which the sound occurs*”. An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

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

- “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.”

Interpreting the guidance given in BS4142, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

- A rating sound level that is +10dB above the background sound level is likely to be an indication of a ‘Significant Observed Adverse Effect Level’;
- A rating sound level that is +5dB above the background sound level is likely to be an indication of a ‘Lowest Observed Adverse Effect Level’;
- The lower the rating sound 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 sound level does not exceed the background sound level, this is an indication of the specific sound source having a low impact and would therefore classify as ‘No Observed Adverse Effect Level’;
- At levels significantly below the measured background sound level (i.e. greater than 10dB), this is an indication of a ‘No Adverse Effect Level’.

During the daytime, the assessment is carried out over a reference time period of 1-hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

Appendix C – Location Plans



Appendix D – Environmental Survey

D.1 – Time History Noise Data

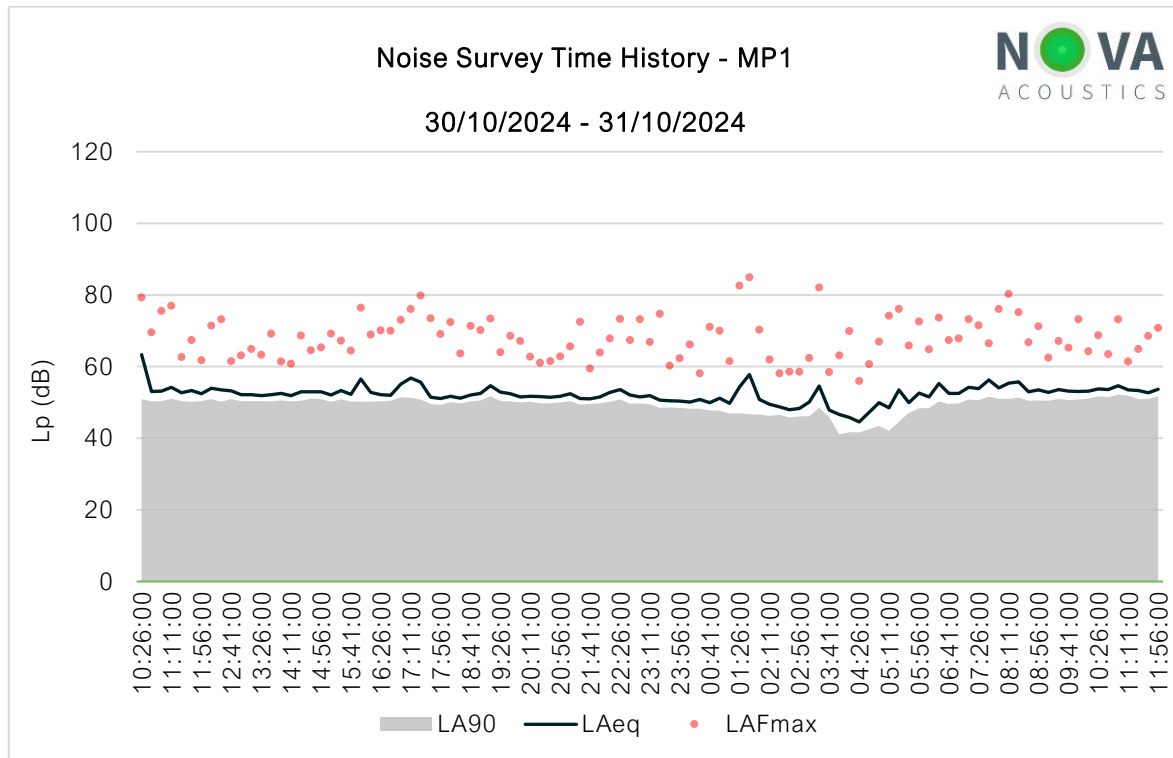


Figure 4 – MP1 Noise Survey Time History

D.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
Svantek SV971A Class 1 Sound Level Meter	141427	≤0.1
Svantek SV36 Class 1 Calibrator	106876	

Table 4 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with negligible deviation noted. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

D.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. However, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted.

The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – Chorlton (Approx. 4.9km SW of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
30/10/2024: 00:00 – 23:59	10.6 – 12.4	0.0	W	0.0 – 0.2
31/10/2024: 00:00 – 23:59	9.7 – 11.5	0.0 – 1.4 ^[1]	W	0.0 – 0.4
Notes:				
[1] rainfall recorded between 06:00 – 08:00 hours, however, did not impact measurements.				

Table 5 – Weather Conditions

Appendix E – Manufacturer Datasheets

1. SPECIFICATIONS

Outdoor units

Model			PURY-P900YSNW-A (-BS)		
Power source			3-phase 4-wire 380-400-415 V 50/60 Hz		
Cooling capacity (Nominal)	*1	kW	101.0		
		kcal/h	86,900		
		BTU/h	344,600		
	Power input	kW	25.76		
		Current input	A	43.4-41.3-39.8	
		EER	kW/kW	3.92	
Temp. range of cooling	Indoor	W.B.	15.0~24.0°C (59~75°F)		
	Outdoor	D.B.	-5.0~52.0°C (23~126°F)		
Heating capacity (Max)	*2	kW	113.0		
		kcal/h	97,200		
		BTU/h	385,600		
	Power input	kW	28.03		
		Current input	A	47.3-44.9-43.3	
		COP	kW/kW	4.03	
	(Nominal)	*3	kW	101.0	
			kcal/h	86,900	
			BTU/h	344,600	
		Power input	kW	22.74	
			Current input	A	38.3-36.4-35.1
COP			kW/kW	4.44	
Temp. range of heating	Indoor	D.B.	15.0~27.0°C (59~81°F)		
	Outdoor	W.B.	-20.0~15.5°C (-4~60°F)		
Indoor unit connectable	Total capacity		50~150% of outdoor unit capacity		
	Model/Quantity		P15~P250/2~50		
Sound pressure level (measured in anechoic room) *4		dB <A>	68.5/73.0		
Sound power level (measured in anechoic room) *4		dB <A>	86.0/92.0		
Refrigerant piping diameter	High pressure	mm (in.)	28.58 (1-1/8) Brazed		
	Low pressure	mm (in.)	41.28 (1-5/8) Brazed		

Set Model			PURY-P450YNW-A (-BS)		PURY-P450YNW-A (-BS)	
FAN	Type x Quantity		Propeller fan x 2		Propeller fan x 2	
	Air flow rate	m ³ /min	315		315	
		L/s	5,250		5,250	
		cfm	11,123		11,123	
	Control, Driving mechanism		Inverter-control, Direct-driven by motor		Inverter-control, Direct-driven by motor	
	Motor output	kW	0.46 x 2		0.46 x 2	
		External static press.	0 Pa (0 mmH ₂ O)		0 Pa (0 mmH ₂ O)	
Compressor	Type		Inverter scroll hermetic compressor		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter		Inverter	
	Motor output	kW	12.4		12.4	
	Case heater	kW	-		-	
	Lubricant	MEL32		MEL32		
External finish			Pre-coated galvanized steel sheets (+powder coating for -BS type)		Pre-coated galvanized steel sheets (+powder coating for -BS type)	
External dimension H x W x D			<MUNSELL 5Y 8/1 or similar>		<MUNSELL 5Y 8/1 or similar>	
Protection devices	High pressure protection	mm	1,858 (1,798 without legs) x 1,240 x 740		1,858 (1,798 without legs) x 1,240 x 740	
		in.	73-3/16 (70-13/16 without legs) x 48-7/8 x 29-3/16		73-3/16 (70-13/16 without legs) x 48-7/8 x 29-3/16	
		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)		
		Inverter circuit (COMP./FAN)		Over-heat protection, Over-current protection		
Refrigerant	Compressor	-		-		
	Fan motor	-		-		
	Type x original charge	R410A x 10.8 kg (24 lbs)		R410A x 10.8 kg (24 lbs)		
Net weight			293 (646)		293 (646)	
Heat exchanger			Salt-resistant cross fin & copper tube		Salt-resistant cross fin & copper tube	
HIC circuit (HIC: Heat Inter-Change)			-		-	
Pipe between unit and distributor	High pressure	mm (in.)	22.2 (7/8) Braze		22.2 (7/8) Braze	
	Low pressure	mm (in.)	28.58 (1-1/8) Braze		28.58 (1-1/8) Braze	
Defrosting method			Auto-defrost mode (Reversed refrigerant cycle)			
Drawing	External	WKS94T753				
	Wiring	WKE94G341		WKE94G341		
Standard attachment	Document	Installation Manual				
	Accessory	-				
Optional parts			Outdoor Twinning kit: CMY-R200VBK4 Joint: CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-R160-J1 Main BC controller: CMB-P108, 1012, 1016V-JA, CMB-P1016V-KA Sub BC controller: CMB-P104, 108V-KB			
Remarks			Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. Due to continuing improvement, above specifications may be subject to change without notice.			

Notes:	Unit converter
1. Nominal cooling conditions (subject to JIS B8615-2) Indoor: 27°C D.B./19°C W.B. (81°F D.B./66°F W.B.), Outdoor: 35°C D.B./24°C W.B. (95°F D.B./75°F W.B.) Pipe length: 7.5 m (24-9/16 ft.), Level difference: 0 m (0 ft.)	BTU/h = kW x 3,412
2. Nominal heating conditions (subject to JIS B8615-2) Indoor: 20°C D.B. (68°F D.B.), Outdoor: 7°C D.B./6°C W.B. (45°F D.B./43°F W.B.) Pipe length: 7.5 m (24-9/16 ft.), Level difference: 0 m (0 ft.)	cfm = m ³ /min x 35.31
3. Nominal heating conditions (subject to JIS B8615-2) Indoor: 20°C D.B. (68°F D.B.), Outdoor: 7°C D.B./6°C W.B. (45°F D.B./43°F W.B.) Pipe length: 7.5 m (24-9/16 ft.), Level difference: 0 m (0 ft.)	lbs = kg/0.4536
4. Cooling mode/heating mode	
5. External static pressure option is available (30 Pa, 60 Pa, 80 Pa/3.1 mmH ₂ O, 6.1 mmH ₂ O, 8.2 mmH ₂ O). Consult your dealer about the specification when setting External static pressure option.	*Above specification data is subject to rounding variation.

MEES17K187

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Oe-3 20

Appendix F – Full Calculations

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
					63	125	250	500	1k	2k	4k	8k		
Model / Unit	Plant Item	Octave-Band Lp	Lp at 1m, Q factor (Q=2)	62	71	66	62	59	55	52	49	53	1	2
No. of	1													
Data Type	Manufacturers Data		Total Lw	70	79	74	70	67	63	60	57	61		
Source Mitigation No														
Description														
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)											
	60	Day	0	70	79	74	70	67	63	60	57	61		
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor	Loss (dB)		Shielding (dB)								No	
	5	2	-22											
Specific Sound Level at NSR1				48	57	52	48	45	41	38	35	39		



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