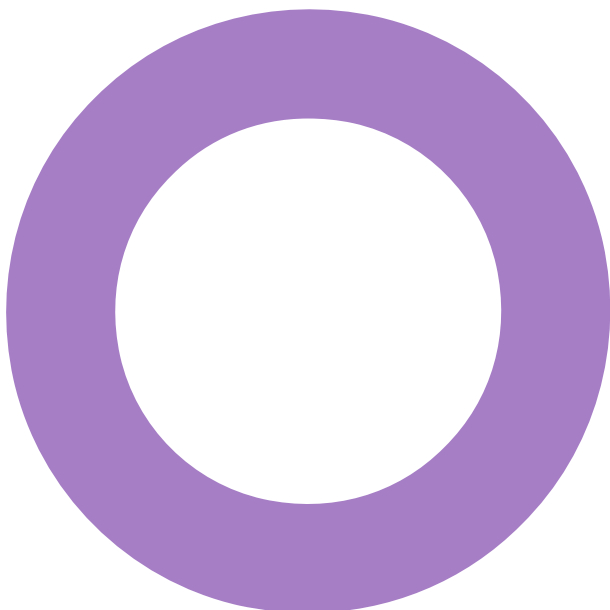


TK Maxx Worthing. Worthing. TJX UK.

ACOUSTICS

NOISE IMPACT ASSESSMENT

REVISION 01 – 01 APRIL 2026



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
01	01/04/2026	For issue.	TH	BRD	BRD

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Project number: 791-443927
Document reference: 443927-HLE-RP-AC-Noise Impact Assessment

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Executive summary.

Hoare Lea has conducted a noise impact assessment of building services plant serving the proposed TK Maxx Store at the Former Poundland Store at 56 Montague Street in Worthing.

The following summarises the assessment procedure and findings contained within this report:

- Reference is made to background noise levels measured by Quantum Acoustics in 2024 and used to define building services plant at the nearest noise sensitive receptors.
- The nearest noise sensitive receptors have been identified as residential dwellings to be formed by the change of use of the upper levels of 56 Montague Street in addition to residential receptors on Chandos Road and Grafton Road.
- It is understood that the store opening hours are 0900 to 1800 Monday to Saturday and 1100 to 1700 on Sundays.
- During the time in which the plant will be operational, the combined building services plant noise emission contribution limit advised is 49 dB(A), one metre from the nearest noise sensitive residential receptor.
- An assessment of noise associated with the proposed items of building services plant has been undertaken. The predicted noise level exceeds the defined noise emission limit by up to 6 dB(A). As such, noise control measures of the air handling exhaust air path are required.
- In order to provide sufficient attenuation of the extract fan of the air handling unit, a silencer of length 600mm and free area 50% is required.
- Incorporation of these mitigation measures is sufficient to provide noise emissions in compliance with the defined noise emission limit.

1. Introduction.

Hoare Lea Acoustics has been appointed by TJX UK to conduct a noise impact assessment for the installation of eight condenser units and an air handling units as part of the proposed TK Maxx Store at the Former Poundland in Worthing.

This report provides an assessment indicating how the new mechanical services plant associated with the development will comply with the Local Authority's criteria.

To aid in the understanding of the assessment, definitions of technical terms used have been included in Appendix A.

2. Site description.

2.1 Existing site.

The proposed TK Maxx Store is the former Poundland Store at 56 Montague Street in Worthing. The site is bound by Montague Street to the south and Chandos Road to the north.

The surrounding buildings are mixed in nature with the commercial retail properties immediately adjacent on Montague Street, as well as residential dwellings along Chandos Road and Grafton Road to the north. The upper floors of 56 Montague Street have also received permission to be converted into 32 residential apartments.

It is understood that the store opening hours are 0900 to 1800 Monday to Saturday and 1100 to 1700 on Sundays.

The proposed development site (indicative only) including the nearest noise sensitive receptors is identified in Figures 1 and 2 below.



Figure 1: Three-dimensional view of site (indicative only).

© Google Earth.



Figure 2: Proposed TK Maxx Store location.

3. Basis of assessment.

3.1 National planning policy framework (NPPF): 2024.

The revised National Planning Policy Framework (1) published in December 2024 sets out the Government's current planning policies for England and how these are expected to be applied. The NPPF supersedes the previous NPPF published in December 2023.

With regards to local noise and vibration, paragraph 198 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 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; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

Reference is made to the DEFRA Noise Policy Statement for England 2010 (NPSfE). This latter document is intended to apply to all forms of noise other than that which occurs in the workplace and includes environmental noise and neighbourhood noise in all forms.

The NPSfE advises that the impact of noise should be assessed on the basis of adverse and significant effect but does not provide any specific guidance on assessment methods or limit sound levels. Moreover, the document advises that it is not possible to have *"a single objective noise-based measure...that is applicable to all sources of noise in all situations"*. It further advises that the sound level at which an adverse effect occurs is *"likely to be different for different noise sources, for different receptors and at different times"*.

In the absence of specific guidance for assessment of environmental noise within the NPPF and the NPSfE, it is considered appropriate to base assessment on current British Standards and national guidance. These are considered to be Local Authority guidance, BS 4142 (2), BS 8233 (3) and the World Health Organisations (4) (WHO) guidelines.

3.2 BS 4142: 2014 + A1: 2019 – Methods for rating and assessing industrial and commercial sound.

Current Government advice to Local Planning Authorities in both England and Wales makes reference to BS 4142 as being the appropriate guidance for assessing commercial operations and fixed building services plant noise. This British Standard provides an objective method for rating the likelihood of complaint from industrial and commercial operations. It also describes means of determining noise levels from fixed plant installations and determining the background noise levels that prevail on a site.

The assessment of impacts is based on the subtraction of the measured background noise level from the rating level determined. The rating level is the source noise level (either measured or predicted) corrected for tone or character (if necessary). The difference is compared to the following criteria to evaluate the impact.

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact.
- A difference of around +5 dB indicates is likely to be an indication of an adverse impact.
- Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact.

This method is only applicable for external noise levels.

3.3 Local planning policy.

3.3.1 Worthing Borough Council Local Plan.

Worthing Borough Council's Local Plan adopted on 28th March 2023 provides a strategy for sustainable development and change in Worthing up to 2036. The Local Plan provides a broad policy framework and long-term spatial strategy to manage development and contains a number of policies to ensure this is achieved.

In relation to noise, the Local Plan contains a single relevant policy, *Policy DM22*.

3.3.1.1 Policy DM22 – Pollution.

Policy DM22 states the following:

- a) *"Development should not contribute to, be put at risk from, or be adversely affected by unacceptable levels of soil, air, water, artificial light or noise pollution or land instability. Where possible development should help to improve local environmental conditions."*
- d) *"Where appropriate, air quality and / or noise assessments and lighting assessments will be required to support planning applications. These should be undertaken in accordance with the most up to date guidance and have regards to any relevant action plans."*

3.3.2 Planning Noise Advice Document: Sussex.

The Planning Noise Advisory Document aims to provide advice for developers and their consultants in making a planning application in East and West Sussex having regard to noise.

In respect of noise from commercial sources, the document states the following:

"The rating level of the industrial or commercial sound source should, where practicable, achieve a level no greater than the representative background sound, when measures in accordance with BS 4142: 2014 + A1: 2019."

3.4 Proposed standards.

3.4.1 Building services – noise.

On the basis of guidance provided within the Planning Noise Advice Document, noise emissions from building services plant associated with the development shall be designed to achieve the following noise levels at 1m from the nearest noise sensitive receptor.

Description of noise source	Noise emission limit
Building services plant	$L_{Ar,Tr} = L_{A90,T}$

Table 1: Noise emission limits for building services.

4. Environmental noise survey.

Reference is made to a previous acoustic survey carried out by Quantum Acoustics as part of the planning application for the change of use of the upper levels of 56 Montague Street centre. Full details of the noise survey are provided in Appendix B. For ease of reference, a summary of the noise survey is provided below.

4.1 Results summary.

A summary of the results from the noise survey conducted by Quantum Acoustics in 2024 is provided in Table 2 below. For ease of reference, Figure 3 below shows the position of the measurement locations as detailed within the Quantum Acoustics report.

Measurement position	Time period	Typical $L_{Aeq,T}$ dB	Modal $L_{A90,T}$ dB
A	Daytime (0700 to 2300)	54	50
	Night-time (2300 to 0700)	49	41
B	Daytime (0700 to 2300)	56	54
	Night-time (2300 to 0700)	45	42
C	Daytime (0700 to 2300)	56	54
	Night-time (2300 to 0700)	53	46
D	Daytime (0700 to 2300)	54	49
	Night-time (2300 to 0700)	44	41

Table 2: Measured noise levels.

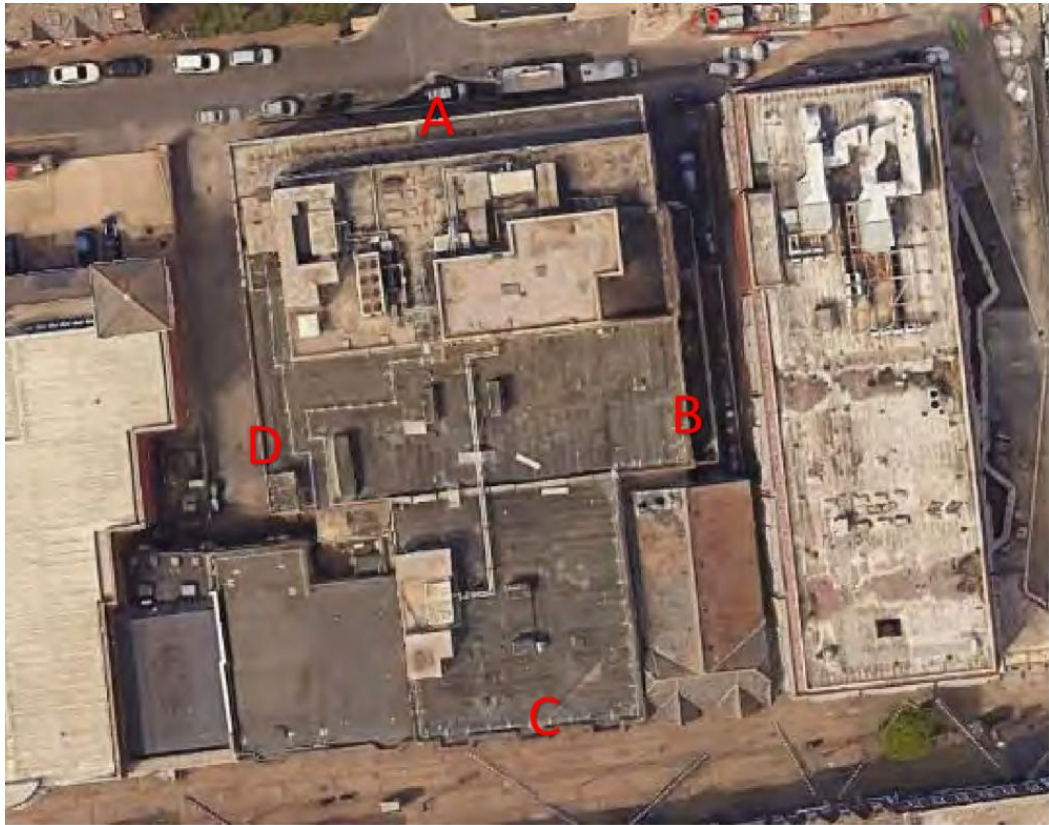


Figure 3: Measurement positions.

© Google Earth.

4.2 Noise emissions of fixed plant.

On the basis of the measured background noise levels and in line with the Planning Noise Advice Document, the following noise emission limits apply at one metre from the nearest noise sensitive receptor. These are replicated in Table 3 below.

Period	Modal Background Noise Level $L_{A90,T}$ dB	Noise Emission Limit Calculation $L_{Ar,Tr}$ dB
Daytime (0700 to 2300)	49	49
Night-time (2300 to 0700)	41	41

Table 3: Building services noise emission limits at nearest residential receptors.

5. Noise sensitive areas.

A noise sensitive area is defined as landscapes or buildings where the occupiers are likely to be sensitive to noise created by new plant installed as part of the proposed development, including residential areas.

The nearest sensitive receptor is therefore identified as residential dwellings to be formed by the change of use of the upper levels of 56 Montague Street in addition to residential receptors on Chandos Road and Grafton Road, as indicated in Figure 4 below.



Figure 4: Nearest noise sensitive receptor.

© Google Earth.

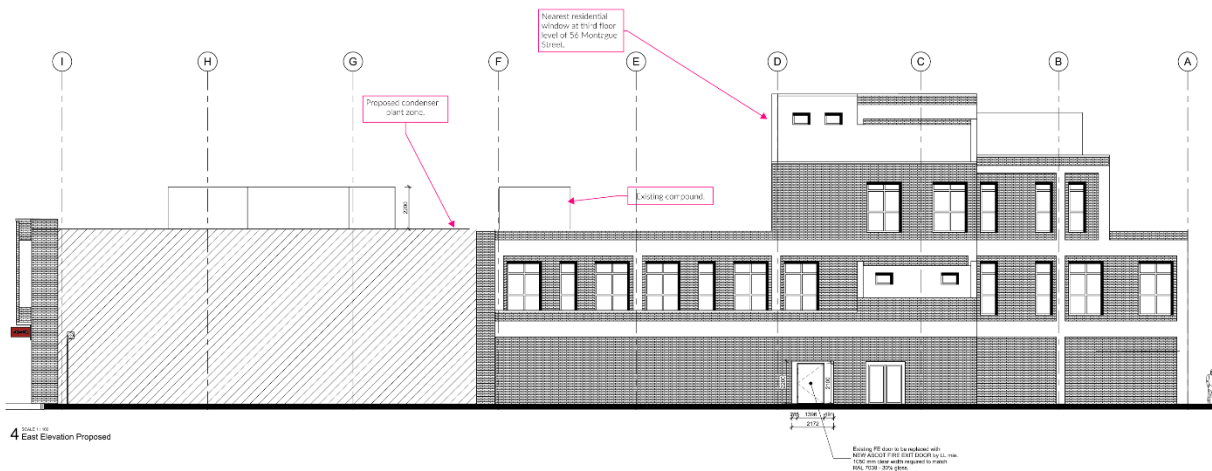


Figure 6: Section showing proposed plant zone, existing solid compounds at roof level and nearest residential window.

In order to determine the level of screening provided by the compound, predictions have been undertaken using in-house software on the basis of the principles of ISO 9613-2. Figure 7 below provides an example of the output from the software identifying the predicted screening for condenser units 03 to 08 to a receiver at third floor level of 56 Montague Street.

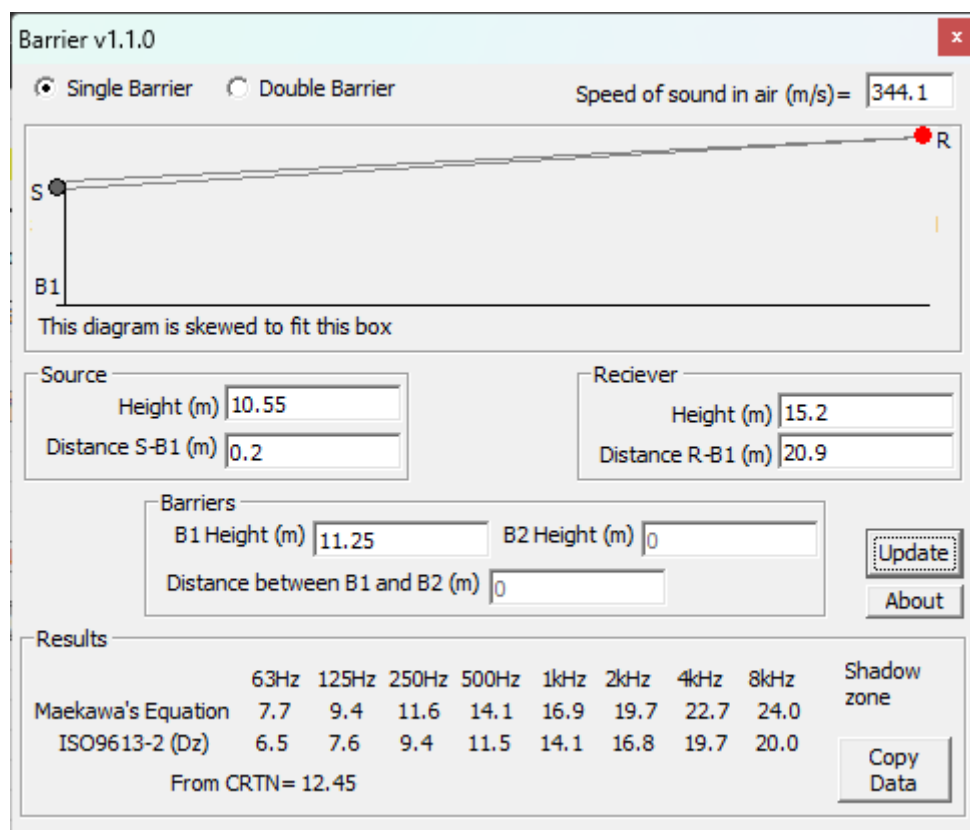


Figure 7: Acoustic screen calculation.

The most appropriate way of determining noise emissions from multiple items of building services plant is through the use of the individual source sound power levels. Whilst this data is not readily available, an area correction (based on the surface area at one metre from the unit) can be applied to the sound pressure levels to estimate the source sound power levels. The following table summarises the manufacturers stated sound pressure level at one metre and the predicted sound power level of each condenser unit.

Condenser unit reference	Model	Manufacturers sound pressure level at 1m dB(A)	Predicted sound power level L _{WA} dB
CU-01	PURY-EP200YNW-A2	59	75
CU-02	PUZ-ZM100CDA	51	66
CU-03, 04, 05, 06, 07 & 08	PUZ-ZM250YKA2	62	77

Table 4: Condenser units - predicted sound power levels.

The following table provides the fan and casing sound power levels for the proposed air handling unit.

AHU	Sound power level per octave band frequency in Hz dB								L _{WA} dB
	63	125	250	500	1000	2000	4000	8000	
Supply – inlet	-	67	69	67	57	51	44	45	66
Extract – outlet	-	78	82	79	79	75	71	72	83
Casing radiated	-	64	58	45	43	46	43	36	54

Table 5: Air Handling Unit (AHU) - sound power levels.

The methodology used to determine noise emissions at the nearest noise sensitive receptor for each item of plant are as follows:

1. Apply a distance correction to the sound power level ($L_{w(man)}$) for the distance to the noise sensitive receptor (r) assuming hemispherical sound propagation:

$$\text{Distance Correction} = 20 \log_{10} r + 8$$

1. Derive L_p at receiver location based on the manufacturers sound power level ($L_{w(man)}$) using following equation:

$$L_{p(receiver)} = L_{w(man)} - \text{Distance Correction}$$

2. Predict sound pressure level for all units in operation.

Condenser unit reference	Estimated L _{WA} dB	Distance correction dB	Screening dB	Predicted sound pressure level dB(A)
CU-01	75	-36 (25m)	-2	37
CU-02	66	-35 (23m)	-6	25
CU-03, 04, 05, 06, 07 & 08	77	-34 (21m)	-12	39*
Predicted sound pressure level (combined)				41

Table 6: Predicted noise level from condensers at residential dwellings at upper floors of 56 Montague Street.

Note *: Predicted sound pressure level using multiple units i.e., all units with same L_{WA} .

AHU reference	L _{WA} dB	Distance correction dB	Directivity factor (based on louvre area)	Predicted sound pressure level dB(A)
Supply – inlet	66	-37 (27m)	-5	24
Extract – outlet	83	-37 (27m)	+2	48
Casing radiated	54	-36 (25m)	-	18
Predicted sound pressure level (combined)				48

Table 7: Predicted noise level from AHU at residential dwellings at upper floors of 56 Montague Street.

Note *: Directivity factor derived from guidance provided within “Fläkt Woods Practical Guide to Noise Control”.

From Tables 6 and 7 it can be seen that the predicted sound pressure level contributions at the nearest residential dwellings on the upper floors of 56 Montague Street are 41 dB(A) from the condenser units and 48 dB(A) from the air handling unit (AHU). Combining these predictions results in a total noise level of 49 dB(A). Comparison with the proposed external noise limits is presented in Table 8 below.

It should be noted that a correction factor has been applied to the specific noise level of +6 dB to derive the expected rating level (in line with guidance contained within BS 4142: 2014 + A1: 2019). This is considered a worst case and pessimistic assumption in respect of the air handling unit but would be expected for the condensers where noise is usually distinctive in character and intermittent.

Period	Plant noise limit L _{A,r,Tr} dB	Predicted plant noise level L _{Aeq,T} dB	
		Specific level	Rating level
Daytime (0700 to 2300)	49	49	55

Table 8: Plant noise limit and predicted noise level – upper floors of 56 Montague Street.

From Table 8 it can be seen that the combined noise emissions exceed the noise emissions limit at the residential dwellings on the upper levels of 56 Montague Street. As such, noise control measures of the air handling unit exhaust air path is required in order to provide adequate attenuation.

In order to provide combined noise emissions in compliance with the defined noise emission limit, noise emissions from the exhaust air path of the air handling is required to be reduced by a minimum 10 dB(A). In order to provide this reduction, a silencer of length 600mm and free area 50% is required.

The provision of the above mitigation measures is sufficient to reduce noise emissions from the proposed plant to 43 dB (specific level) and 49 dB (rating level), and therefore ensure that noise emissions are in compliance with the noise emission limits derived in Table 3.

Noise levels at sensitive receptors located at further distances as well as those at lower levels of 56 Montague Street where the screening provided will be higher, would be lower than those predicted above and therefore acceptable in terms of their noise exposure.

It should be noted that the assessment provided within this Section is considered worst case as it assumes that all plant is operating at maximum duty. In reality, this is extremely unlikely and therefore noise levels are likely to be significantly lower during most periods of the working day.

7. Summary & conclusions.

Hoare Lea has conducted a noise impact assessment of building services plant serving the proposed TK Maxx Store at 56 Montague Street in conjunction with a previous environmental noise survey conducted in 2024.

Reference is made to background noise levels measured by Quantum Acoustics in 2024 and used to define building services plant at the nearest noise sensitive receptors. The nearest noise sensitive receptors have been identified as residential dwellings to be formed by the change of use of the upper levels of 56 Montague Street in addition to residential receptors on Chandos Road and Grafton Road.

It is understood that the store opening hours are 0900 to 1800 Monday to Saturday and 1100 to 1700 on Sundays.

During the time in which the proposed plant will be operational during the daytime, the combined building services plant noise emission contribution limit advised is 49 dB(A), one metre from the nearest noise sensitive residential receptor.

An assessment of noise associated with the proposed items of building services plant has been undertaken. The predicted noise level exceeds by up to 6 dB(A). As such, noise control measures of the air handling unit exhaust air path is required.

In order to provide sufficient attenuation of the extract fan of the air handling unit, silencers of length 600mm and free area 50% are required.

Incorporation of the above mitigation measures is sufficient to provide noise emissions in compliance with the defined noise emission limit.

The guidance provided within this report is sufficient to satisfy the requirements of the Worthing Borough Council, in our opinion.

This assessment has been conducted by Tom Hills who is a Chartered Engineer and a Member of the Institute of Acoustics and hold a First-Class Masters in Acoustic Engineering. Hoare Lea Acoustics area also a member organisation of the ANC.

8. References.

1. *National Planning Policy Framework, Department for Communities and Local Government, December 2024.*
2. *BS 4142: 2014 + A1: 2019: 'Method for rating and assessing industrial and commercial sound'.*
3. *BS 8233: 2014, "Guidance on Sound Insulation and Noise Reduction for Buildings", BSI.*
4. *World Health Organisation (WHO) - Environmental Noise Guidelines for the European Region, 2018.*
5. *ISO 9613-2: 1996, 'Acoustics - Attenuation of Sound during Propagation Outdoors - Part 2'.*

Appendix A – Acoustic terminology.

Sound

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air.

The Sound Pressure

The Sound Pressure is the force (N) of sound on a surface area (m²) perpendicular to the direction of the sound. The SI-units for the Sound Pressure are Nm⁻² or Pa (Pascal).

Sound is measured with microphones responding proportionally to the sound pressure – p. The power is proportional to the square of the sound pressure.

The Sound Pressure Level

The human ear has an approximately logarithmic response to sound pressure over a very large dynamic range. The lowest audible sound pressure approximately 2×10^{-5} Pa (2 ten billionths of an atmosphere) and the highest is approximately 100 Pa.

It is therefore convenient to express the sound pressure as a logarithmic decibel scale related to this lowest human audible sound, where:

$$L_p = 10 \log \left(\frac{p^2}{p_{ref}^2} \right) = 10 \log \left(\frac{p}{p_{ref}} \right)^2 = 20 \log \left(\frac{p}{p_{ref}} \right)$$

Where:

L_p = sound pressure level (dB)

p = sound pressure (Pa)

$p_{ref} = 2 \times 10^{-5}$ – reference sound pressure (Pa)

In accordance with the logarithmic scale, doubling the sound pressure level gives an increase of 6 dB.

Decibel (dB)

The decibel is the unit used to quantify sound pressure levels as well as sound intensity and power levels.

In accordance with the logarithmic scale, an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pa). Subjectively, this increase would correspond to a doubling of the perceived loudness of the sound.

Sound Pressure Level of Some Common Sources

An indication of the range of sound levels commonly found in the environment is given in the following Table.

Source	Sound Pressure Level dB
Threshold of Hearing	0
Rustling Leaves	20
Quiet Whisper	30
Home	40
Quiet Street	50
Conversation	60
Inside a Car	70
Loud Singing	80
Motorcycle (10m)	90
Lawn Mower (1m)	100
Diesel Truck (1m)	110
Amplified Music (1m)	120
Jet Plane (1m)	130

Frequency

The rate at which the pressure fluctuations occur determines the pitch or frequency of the sound. The frequency is expressed in Hertz (Hz) or cycles per second.

Octave and Third Octave Bands

An octave is the interval between two points where the frequency at the second point is twice the frequency of the first.

There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz.

Third octave bands provided a fine resolution by dividing each octave band into three bands. For examples, third octave bands would be 160 Hz, 250 Hz and 315 Hz for the same 250 Hz octave band.

The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequency than to low frequencies within the range. This is the basis of the A-weighting.

A-Weighting

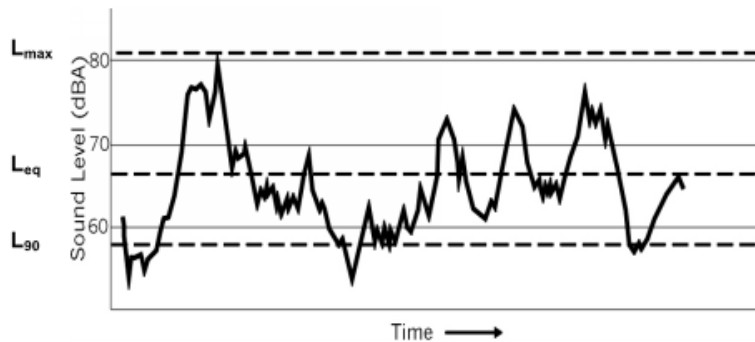
The A-weighting is a correction term applied to the frequency range in order to mimic the sensitivity of the human ear to noise. It is generally used to obtain an overall noise level from octave or third octave band frequencies.

An A weighted value would be written as dB(A) or including A within the parameter term.

Noise Units

In order to assess environmental noise, measurements are carried out by sampling over specific periods of time, such as five minutes, the statistically determined results being used to quantify various aspects of the noise.

The figure below shows an example of sound level varying with time. Because of this time variation the same period of noise can be described by several different levels. The most common of these are described below.



$L_{eq,T}$

The $L_{eq,T}$ is a parameter defined as the equivalent continuous sound pressure level over a defined time period 'T'. It is the sound pressure level equivalent to the acoustic energy of the fluctuating sound signal.

The $L_{eq,T}$ can be thought of as an 'average' sound pressure level over a given time period (although it is not an arithmetic average). Typically, the $L_{eq,T}$ will be an A-weighted noise level in dB(A) and is commonly used to describe all types of environmental noise sources.

$L_{01,T}$

The $L_{01,T}$ is a parameter defined as the sound pressure level exceeded for 1% of the measurement period 'T'.

It is a statistical parameter and cannot be directly combined to other acoustic parameter.

$L_{10,T}$

The $L_{10,T}$ is a parameter defined as the sound pressure level exceeded for 10% of the measurement period 'T'.

It is a statistical parameter and cannot be directly combined to other acoustic parameter and is generally used to describe road traffic noise.

$L_{90,T}$

The $L_{90,T}$ is a parameter defined as the sound pressure level exceeded for 90% of the measurement period 'T'.

It is a statistical parameter and cannot be directly combined to other acoustic parameter and is generally used to describe the prevailing background noise level.

$L_{max,T}$

The $L_{max,T}$ is a parameter defined as the maximum noise level measured during the specified period 'T'.

Specific Noise Level, $L_{Aeq,T,r}$

This is the equivalent continuous A-weighted sound pressure level at the assessment position due to a specific noise source operating over a given time interval.

Free Field

A measurement taken in the free field is at least 3.5m from reflecting vertical surfaces and 1.2m from the ground.

Façade

A measurement is influenced by the reflection of sound from the façade of a building within 3.5m. A façade measurement is made 1m in front of the vertical building surface.

R_w

A single-number quantity which characterizes the airborne sound insulation of a material or building element in the laboratory. See BS EN ISO 717-1: 1997.

Appendix B – Environmental Noise Survey.

56 MONTAGUE STREET
WORTHING
WEST SUSSEX
BN11 3HE

Environmental Noise Survey and
Noise Impact Assessment

23 April 2024

Client:
Oaten Architects Ltd

QA23401/NIA

Document Control

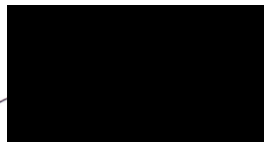
Document Information

Information	Description
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Document History

Revision	Issue Date	Changes
0	21 February 2024	-
1	28 February 2024	-
2	23 April 2024	Updated site plans

Document Approvals

Role	Name	Signature	Date
Preparation	Luke Papini Assistant Acoustic Consultant MSc		23/04/2024
Approval	John Ridpath Director BSc (Hons), MIOA		23/04/2024

For Information

Please Note

Quantum Acoustics Ltd have prepared this report with generally accepted acoustic consultancy principles, using all reasonable skill, care and diligence. This is as per the terms agreed between Quantum Acoustics Ltd and our Client. Information referred to herein which may have been provided by third parties should not be assumed to have been checked and verified by Quantum Acoustics Ltd, unless specifically confirmed to the contrary. Both confidential and commercially sensitive information is contained within this document, and as such it should not be disclosed to third parties. Any third party choosing to rely on this document does so at their own risk.

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1.0 INTRODUCTION

Quantum Acoustics Ltd has been instructed to prepare this Noise Assessment to accompany a prior approval application for the proposed change of use of floors 1-3 at 56 Montague Street, Worthing, West Sussex, BN11 3HE. The application seeks the change of use of existing vacant commercial space (Use Class E) to create 32 new residential flats (Use Class C3).

Under the Town and Country Planning Act (General Permitted Development) (Amendment) Order 2021, a Class MA permitted development is allowed to convert to residential (Use Class C3). A prior approval application is required to the Local Authority to consider the *“impacts of noise from commercial premises on the intended occupiers of the development”*.

2.0 SITE DESCRIPTION

The site at 56 Montague Street is an existing, 4-storey building located in Worthing, West Sussex. Its current uses are commercial space at ground and 1st floor levels, with the remaining floors serving as existing vacant commercial space. The location of the site is shown in red in the figure below:

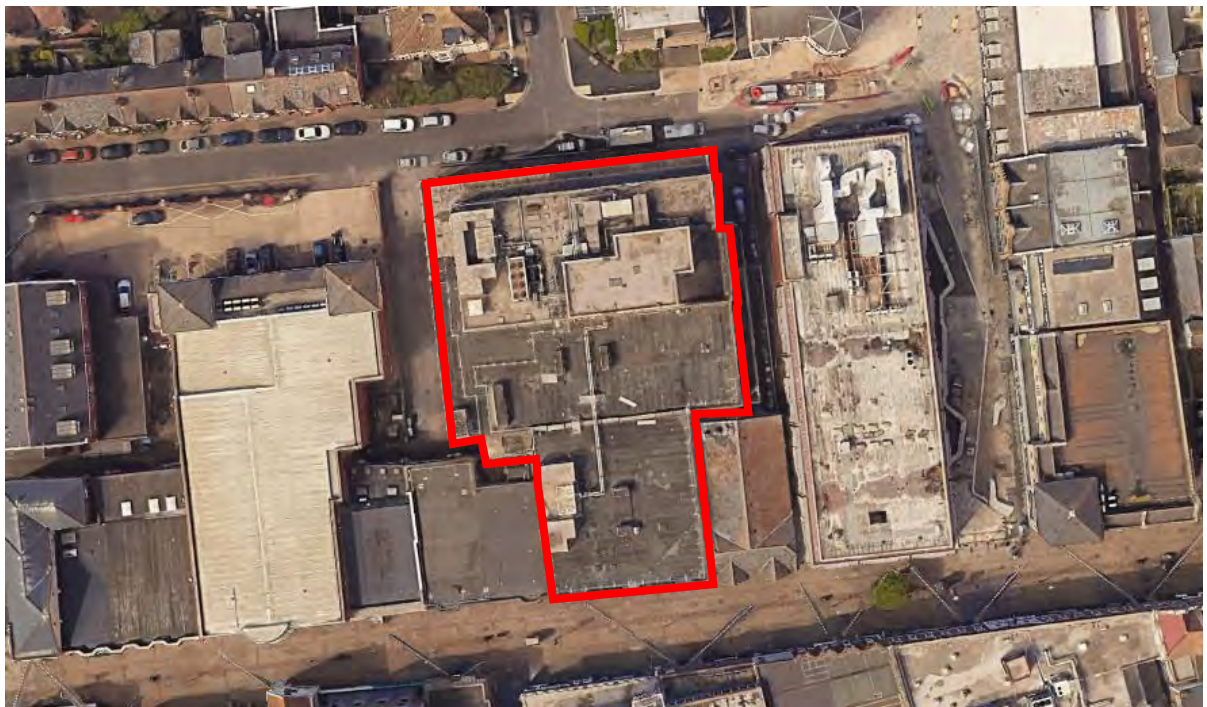
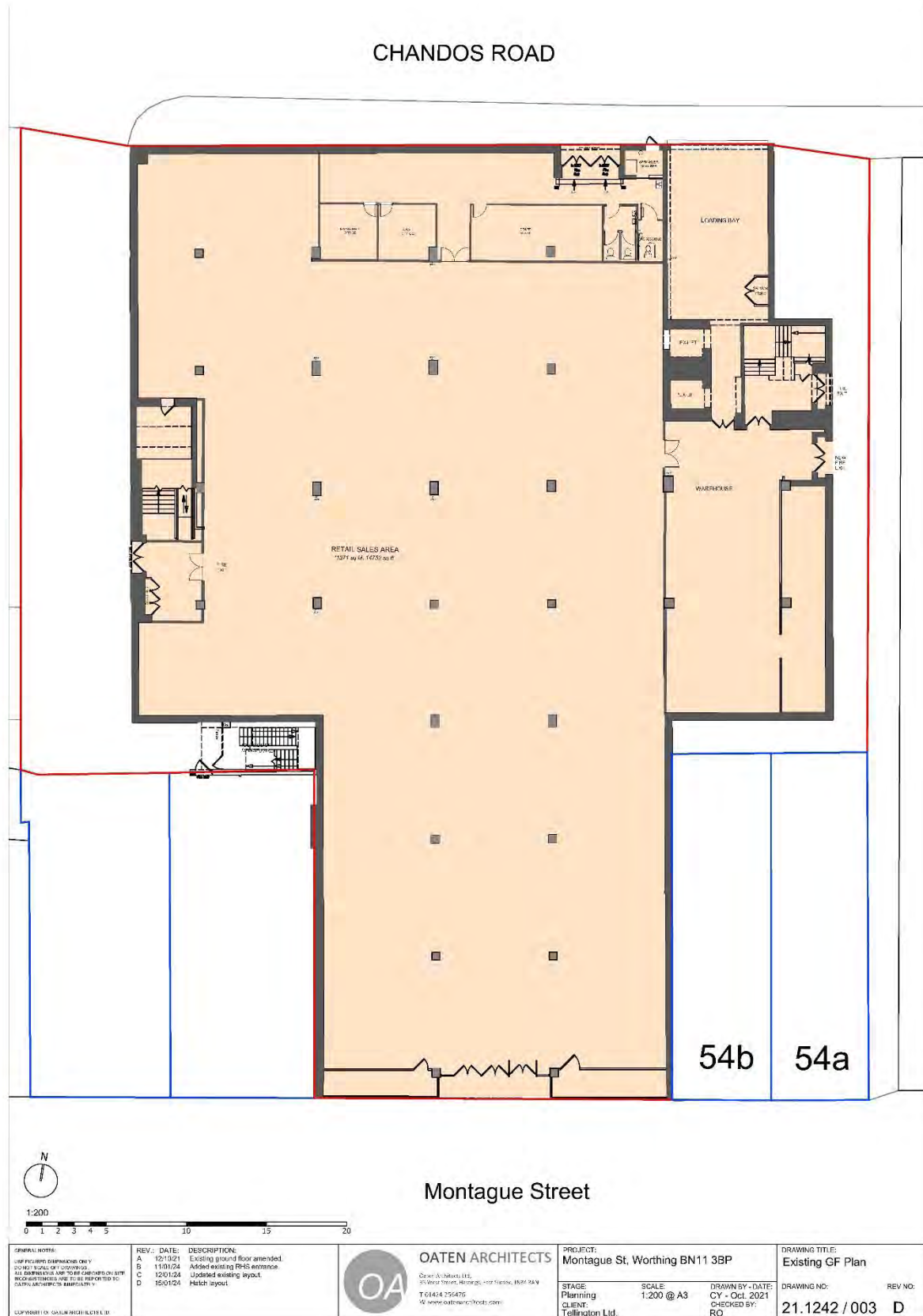
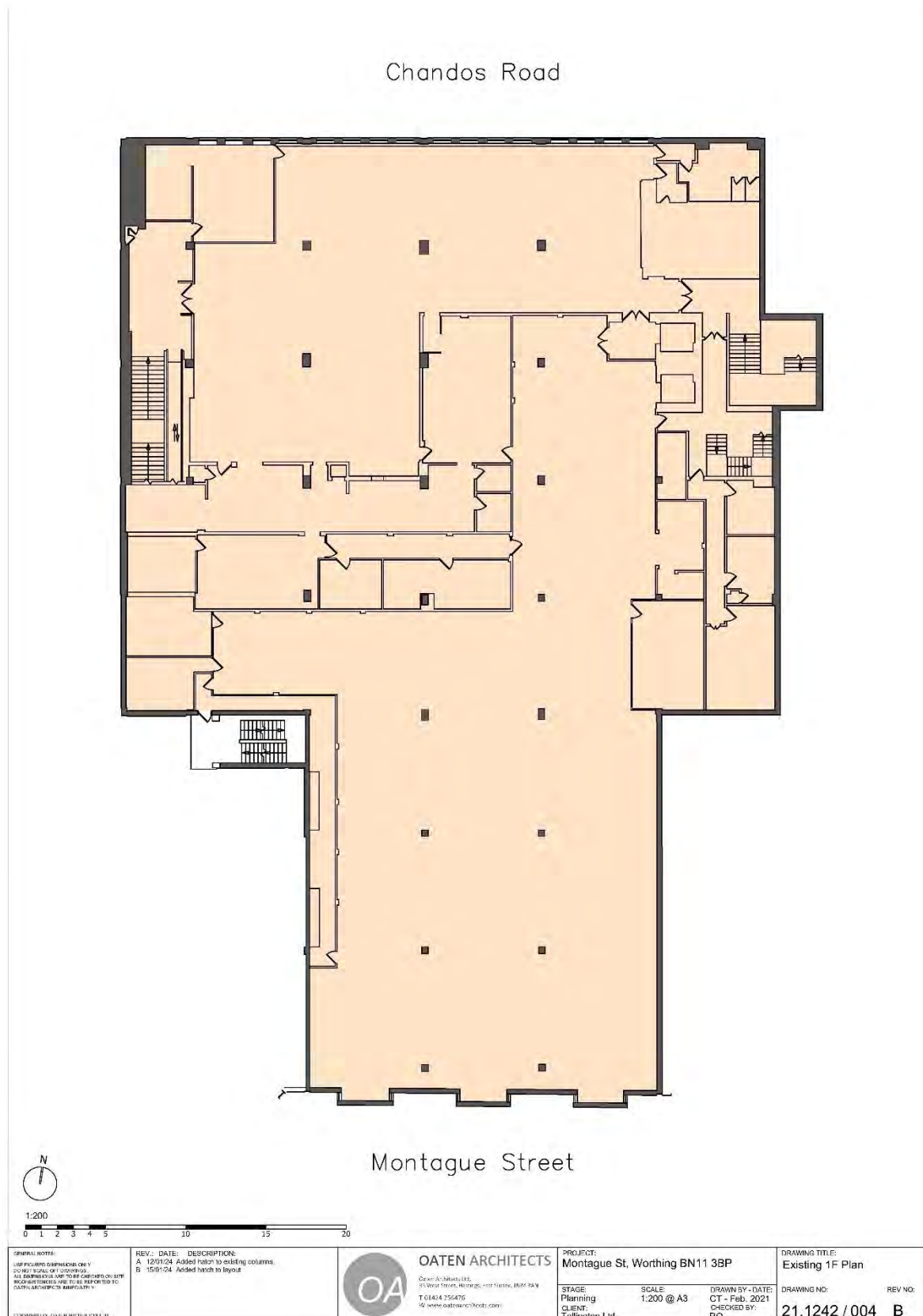


Figure 1. Site Plan (Google Imagery 2023, The GeoInformation Group)

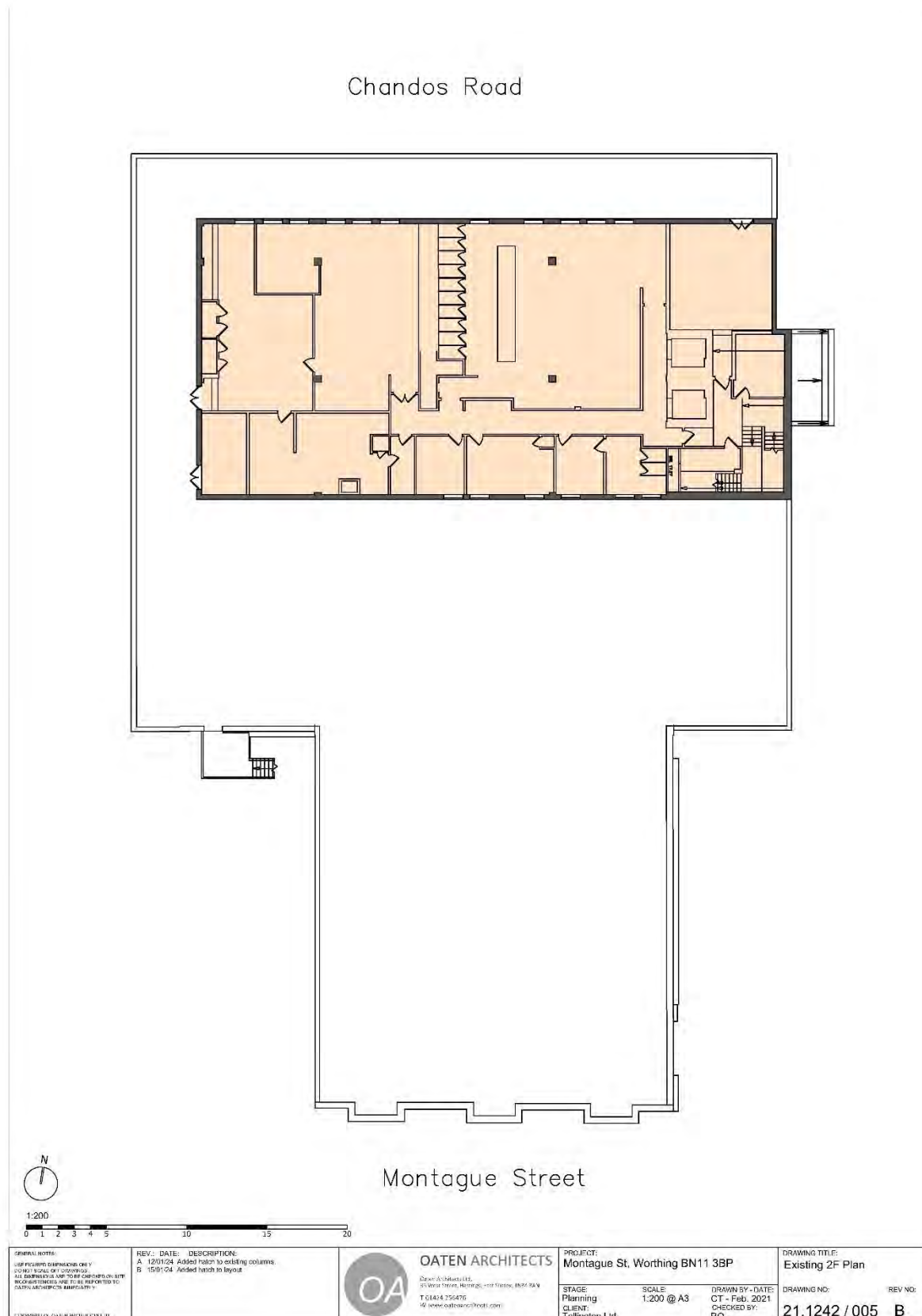
The application site consists of 62m² on the ground floor, 1249m² on the 1st floor, 601m² on the 2nd floor and 193m² on the 3rd floor making a total proposed residential area of 2105m².

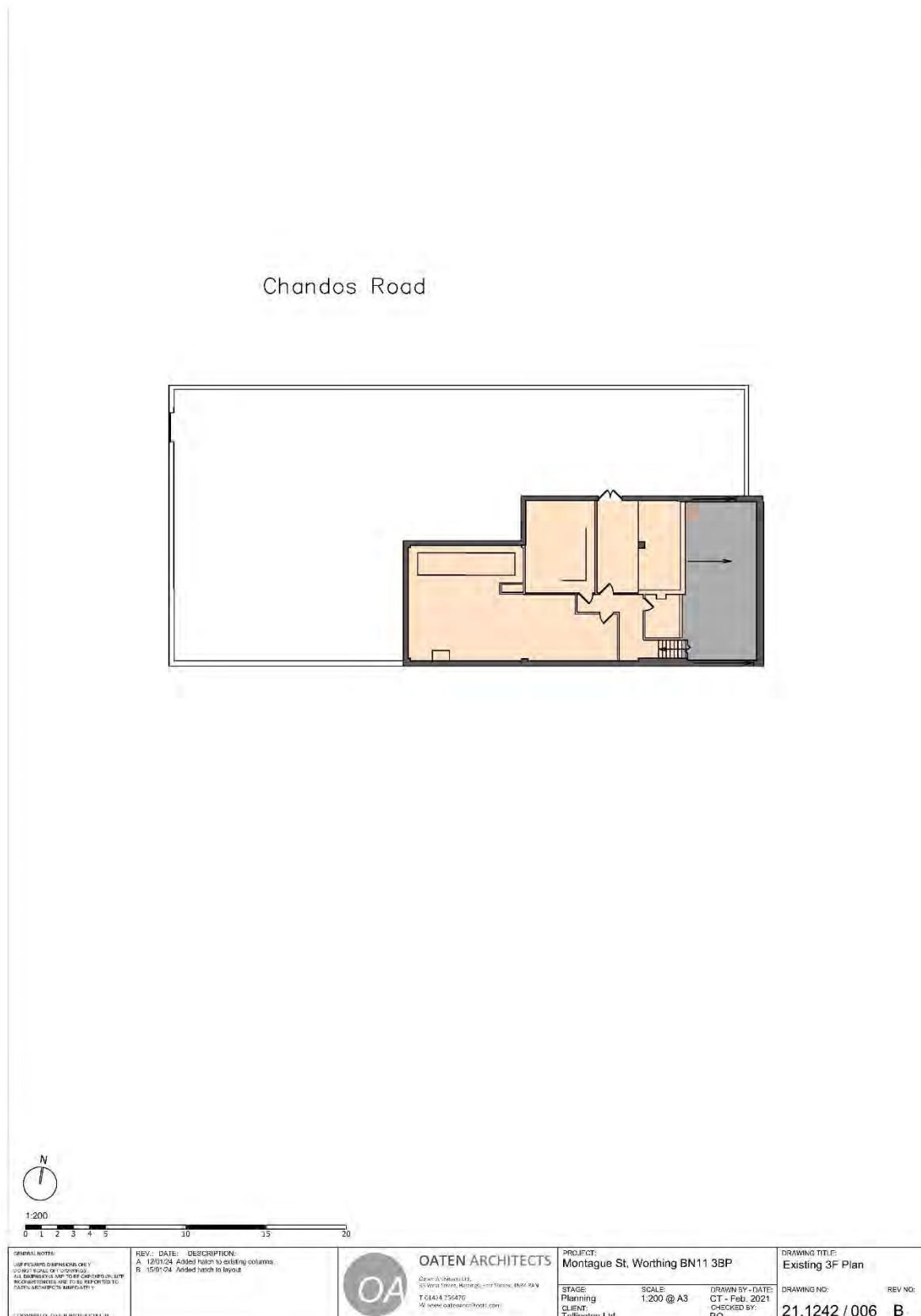
Exiting Ground Floor



Existing 1st Floor

Existing 2nd Floor



Existing 3rd Floor

The proposed residential site is on top of Poundland which is situated on the ground floor.

The site is bounded by Chandos Road, Montague Street, a pathway east of the site which connects Chandos Street and Montague Street and a small road off Chandos Road which is used to access the rear of 58-64 Montague Street.

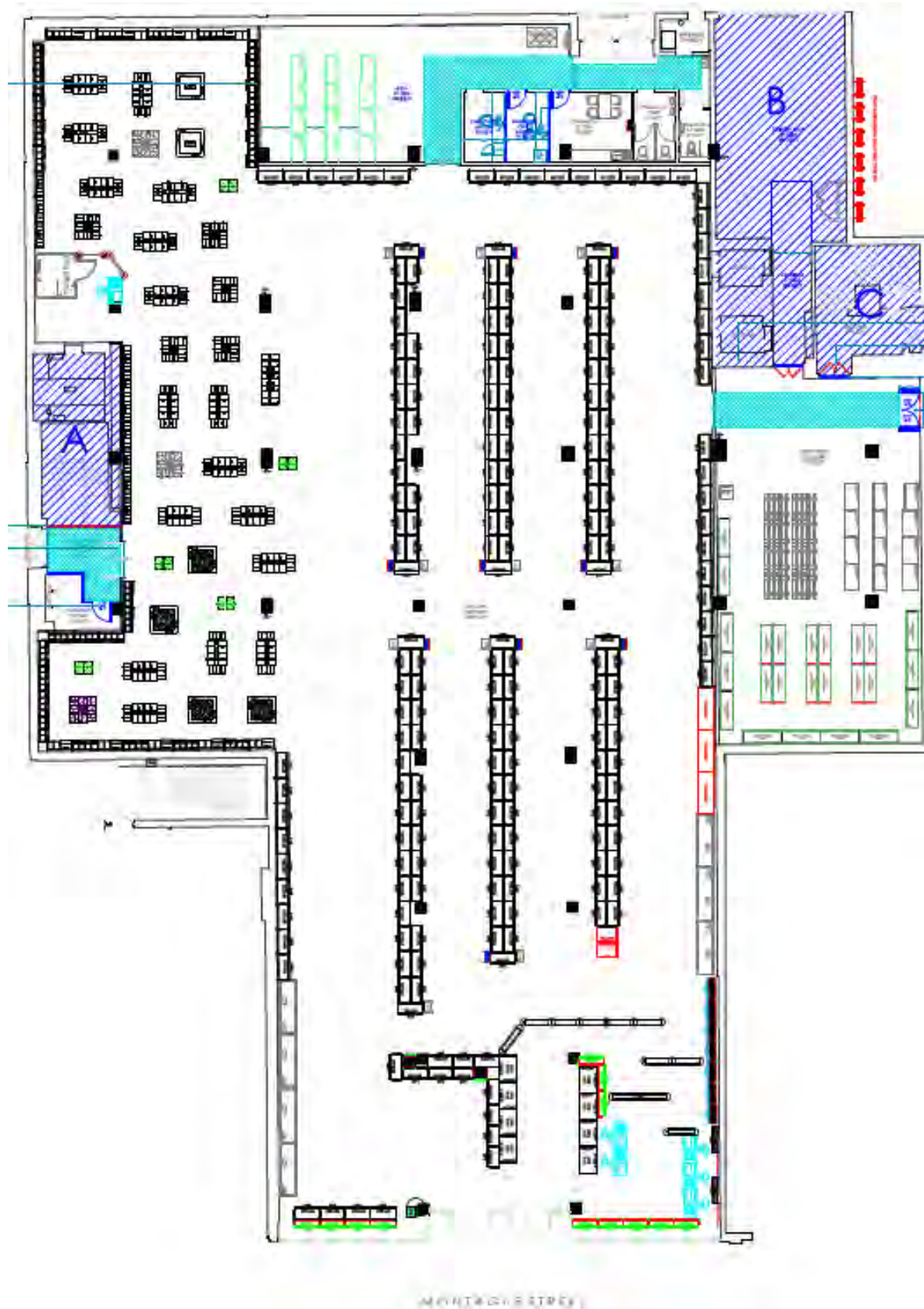
The site is situated between several commercial properties mainly distributed along Montague Street including a JD Sports, River Island, Boots and Sports Direct. It is directly adjacent to Saver's Health and Beauty to the east and Clinton's to the west.

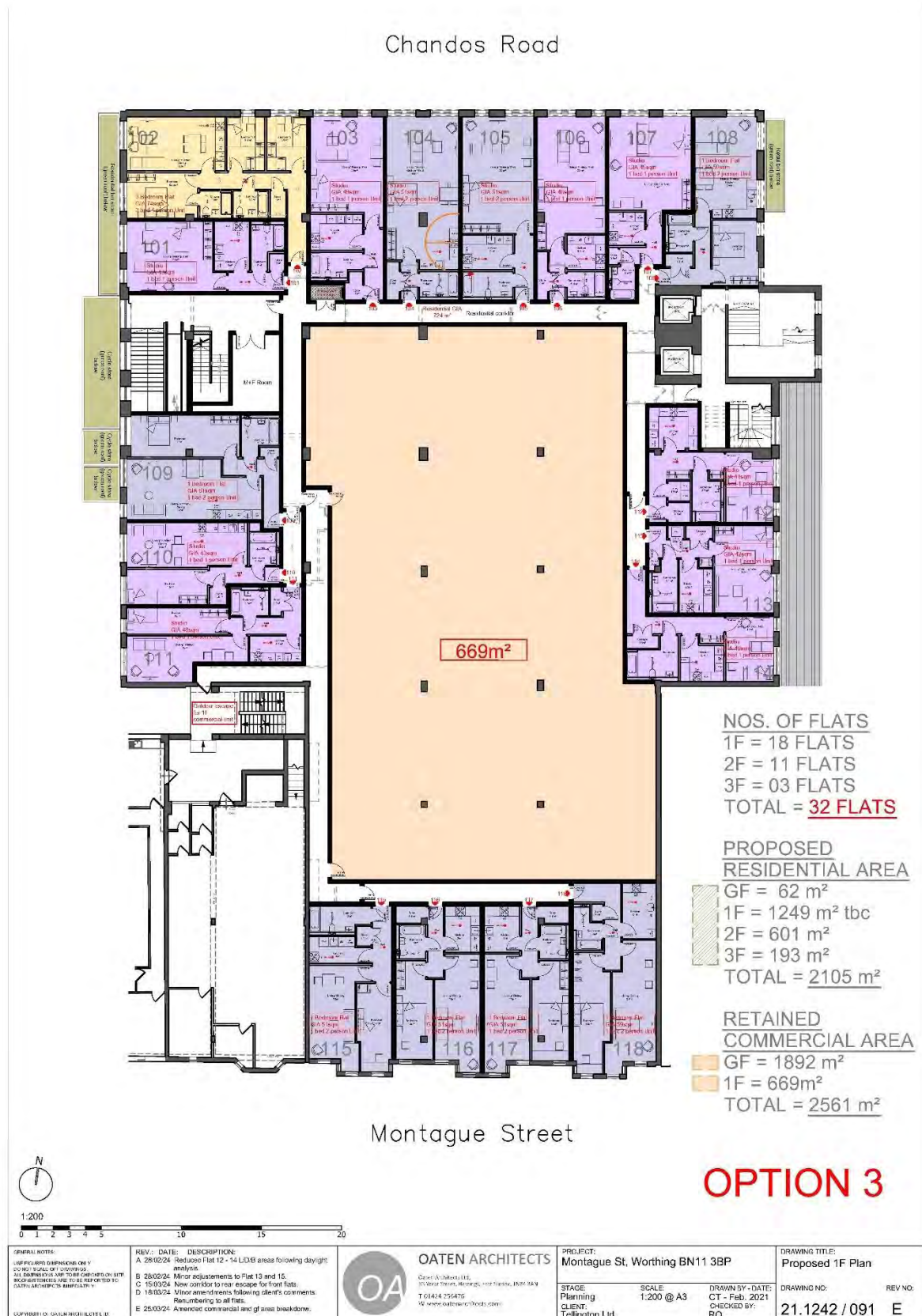
To the north, there are 2 and 3 storey residential properties on Grafton Road, Chandos Road, Portland Road and Shelly Road.

Grafton multi-storey car park is located approximately 50m south of the site on the opposite side of Montague Street.

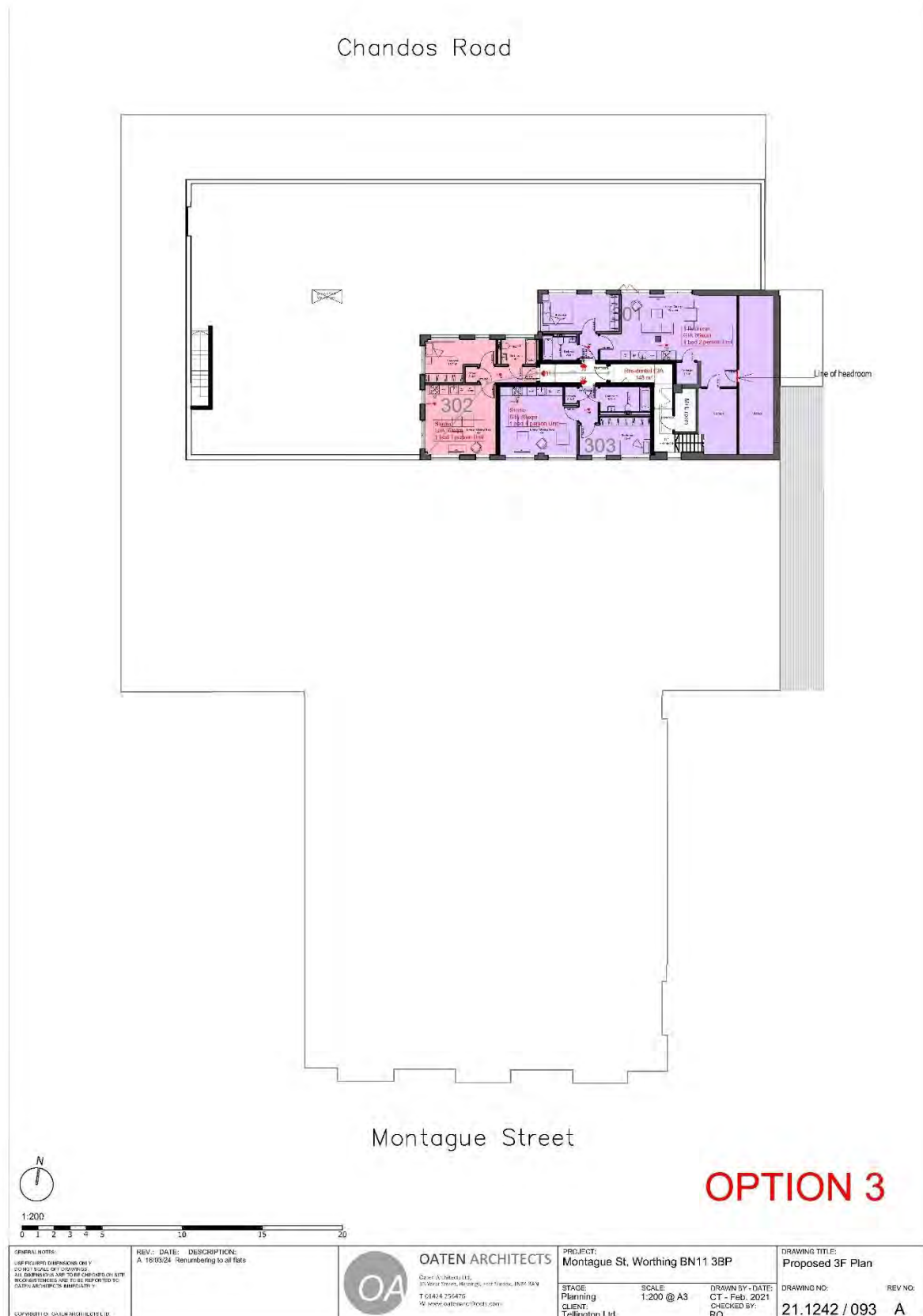
3.0 PROPOSED DEVELOPMENT

The proposed change of use would create 32 new residential units across levels 1 to 3 and an entrance to the west of the building at ground level. The proposed general arrangement of the building is shown in the following floor plans:

Proposed Ground Floor

Proposed 1st Floor

Proposed 2nd Floor

Proposed 3rd Floor

4.0 ENVIRONMENTAL NOISE SURVEY

Two automated environmental noise surveys were undertaken at approximately:

- 14:30 Tuesday 23rd January 2024 to 14:30 Wednesday 24th January 2024.
- 14:30 Thursday 1st February 2024 to 14:30 Friday 2nd February 2024.

Weather conditions were mainly dry with light winds. The conditions were therefore deemed suitable for the measurement of environmental noise.

4.1 Measurement Procedure

The sound level meters used for the surveys were positioned towards the northern, western, southern and eastern boundaries of site on the roof at 2nd floor level.

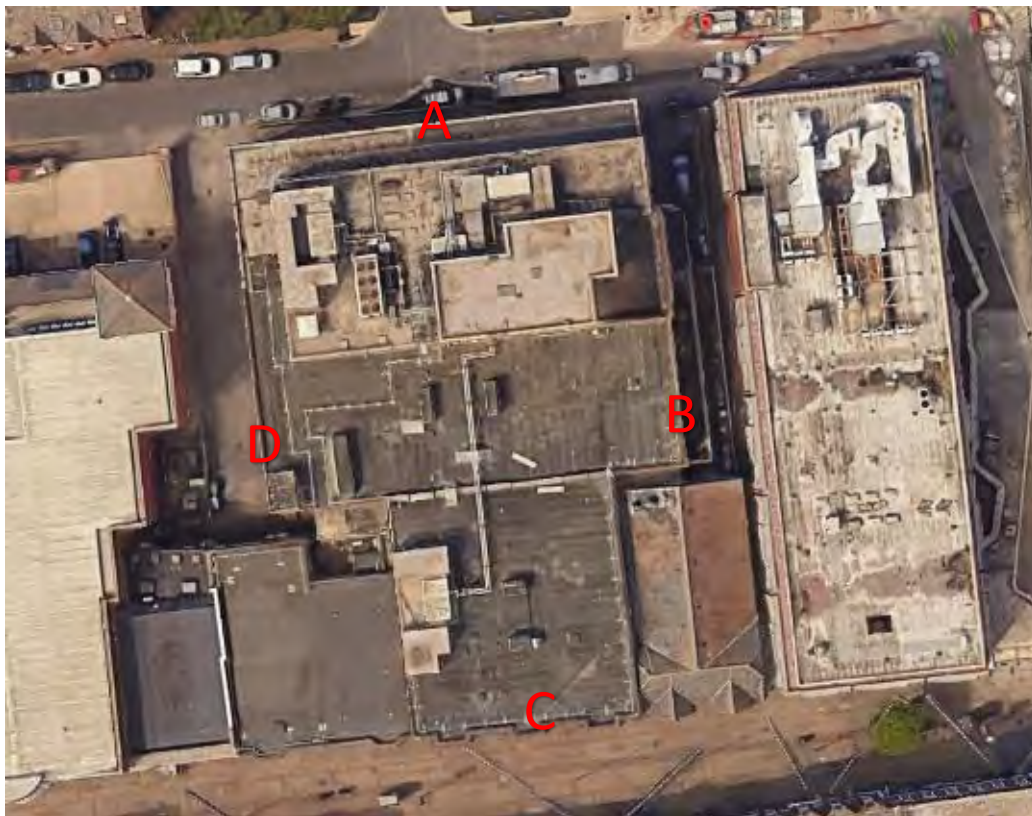


Figure 2. Measurement Location Plan (Google Imagery 2023, The Geoinformation Group)

Position	Description
A	Positioned towards the northern boundary of the site overlooking Chandos Road. The microphone was mounted on a pole at a height of approximately 2m above 2 nd floor roof level.
B	Positioned towards the eastern boundary of the site overlooking the small pathway connecting Chandos Road and Montague Street. The microphone was mounted to the roof railing at a height of 2m above 2 nd floor roof level.
C	Positioned towards the southern boundary of the site overlooking Montague Street. The microphone was mounted on the perimeter railing at a height of 1.5m above 2 nd floor roof level.
D	Positioned towards the western boundary of the site overlooking the small road off Chandos Road which commercial vehicles use for unloading. The microphone was fixed to a pole on the 2 nd floor roof and positioned at a distance of 1m from the façade.

4.2 Equipment

Details of the equipment used for the survey are summarised in the following table:

Position	Description	Manufacturer	Type	Serial Number
A	Type 1 Sound Level Meter	Svantek	971A	124647
B	Type 1 Sound Level Meter	Svantek	971A	133519
C				
D	Type 1 Sound Level Meter	Svantek	971A	124647

The sound level meters were placed inside a weatherproof case, connected via an extension cable and fitted with a microphone windshield.

Calibration of the equipment is traceable to national standards. Calibration certificates are available on request.

Calibration checks were carried out prior to and on completion of the survey, with no significant calibration drift observed.

5.0 SURVEY FINDINGS

The following section uses the following acoustic terms:

A-weighted noise levels are frequency-weighted in a way that approximates the frequency response of the human ear and allows sound levels to be expressed as a single figure value. The A-weighted level is therefore a measure of the subjective loudness, rather than physical amplitude.

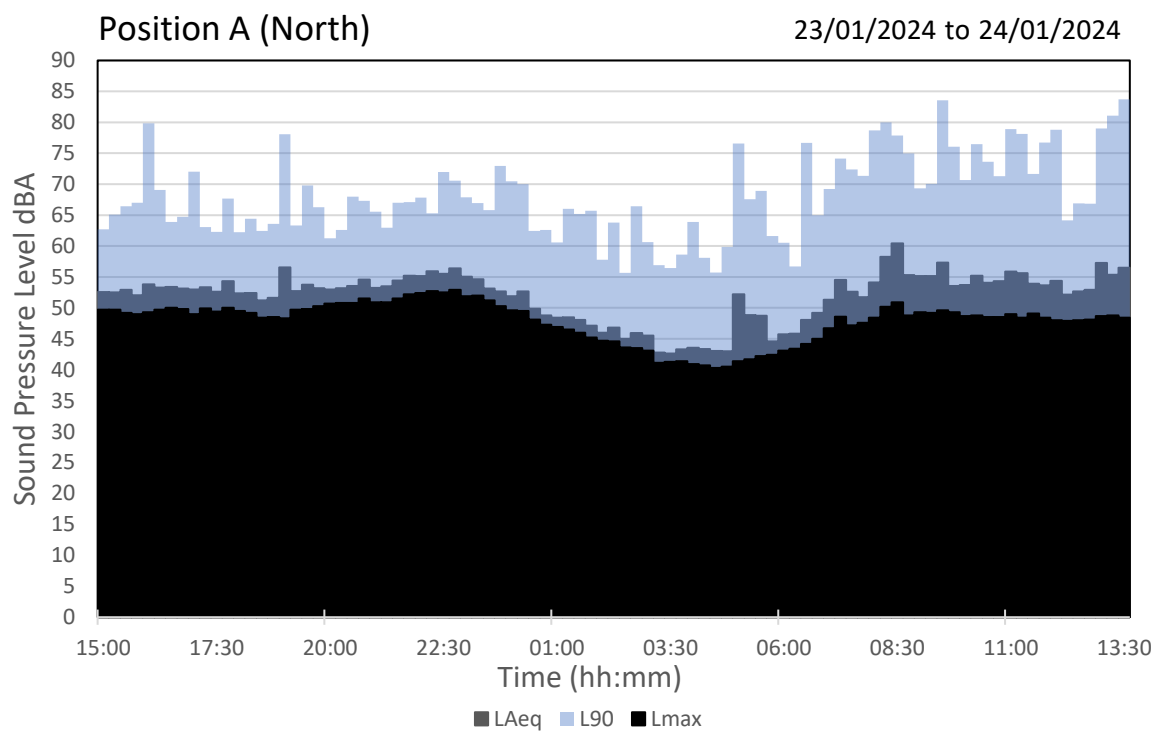
L_{90} is the noise levels that is exceeded for 90% of the measurement period. It reflects the quiet periods during that time and is often referred to as the "background noise level". It is often used as a basis for setting noise emission criteria.

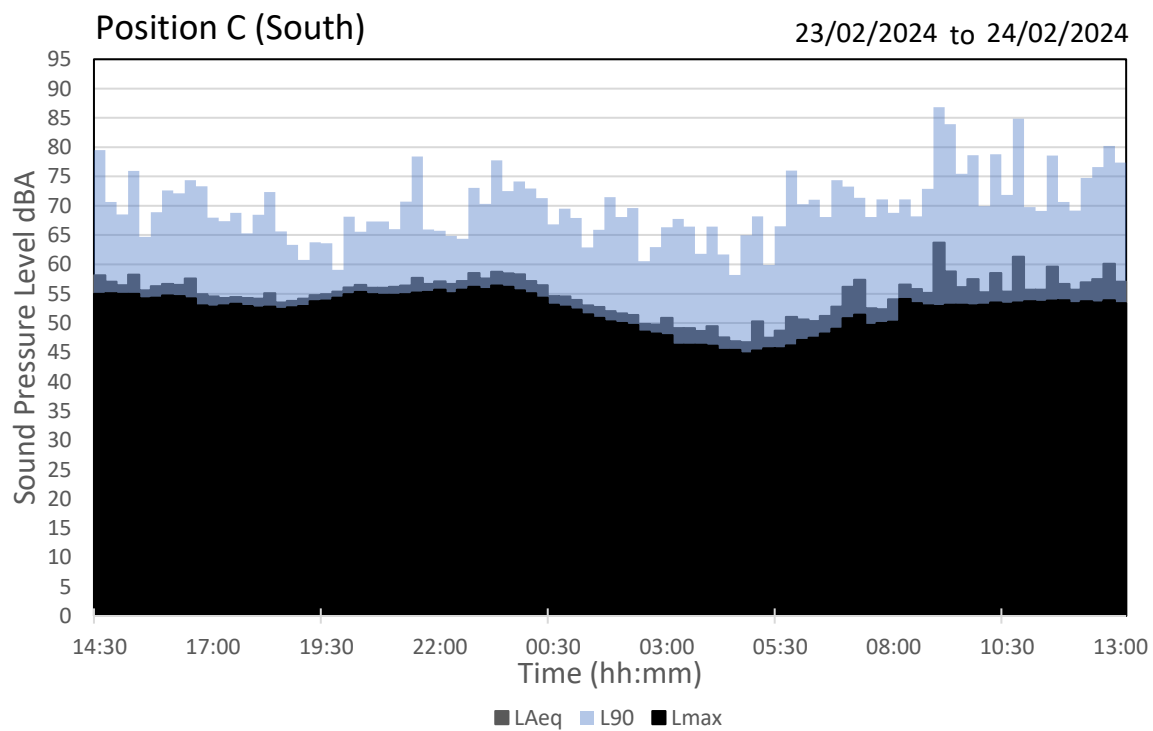
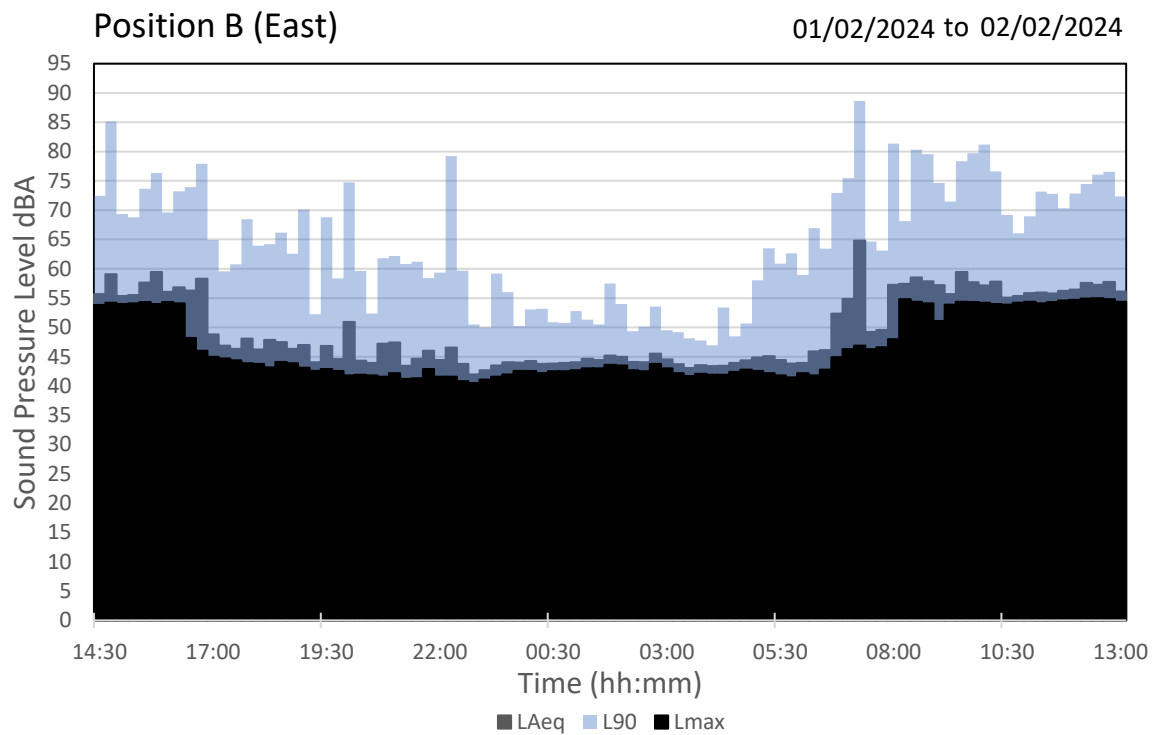
L_{eq} is the level of a notional continuous sound that would deliver the same sound energy as the actual fluctuating sound over the measurement period. This may be thought of as the "average" level during the measurement period.

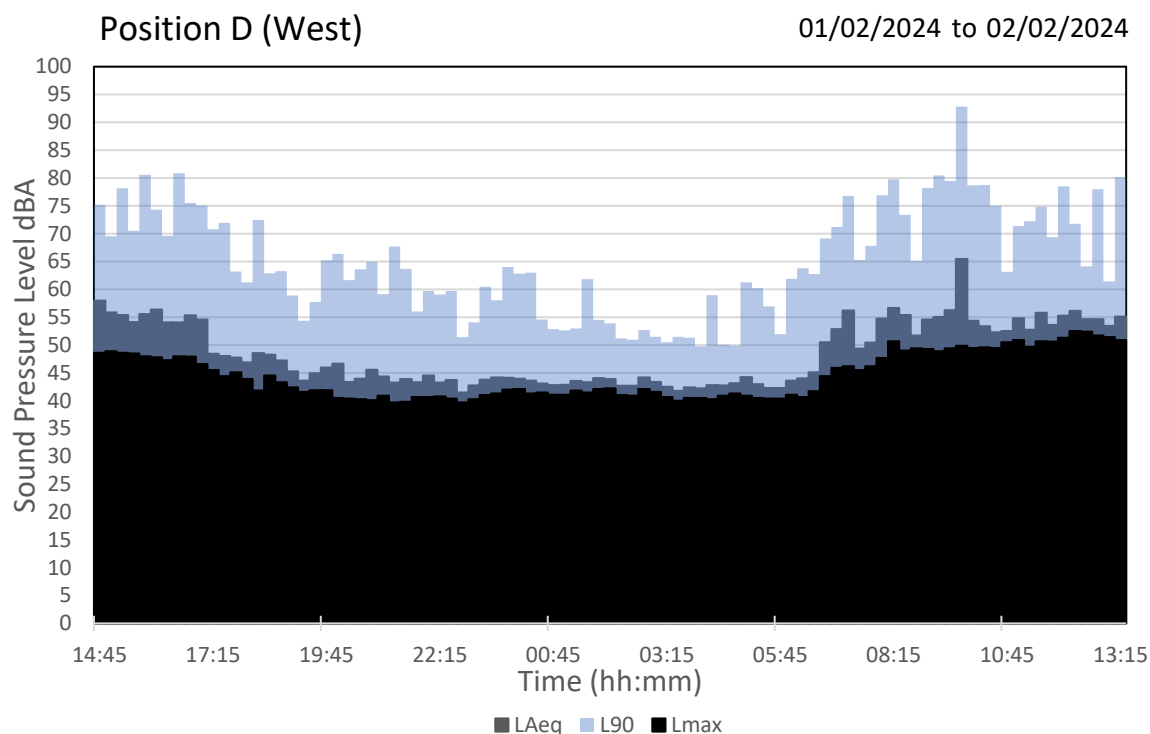
L_{max} is the maximum noise level during the measurement period.

5.1 Noise Level Results

The noise survey results are presented in the tables below which show the A-weighted L_{90} , L_{eq} and L_{max} noise levels measured during each consecutive 15-minute period of the survey.







The measured modal background (L_{90}) noise levels are presented in the table below:

Modal Background L_{90} Noise Levels		
Position	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
A	50	41
B	54	42
C	54	46
D	49	41

The measured minimum background (L_{90}) noise levels are presented in the table below:

Minimum Background L_{90} Noise Levels		
Position	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
A	47	40
B	41	41
C	50	45
D	40	40

The measured daytime L_{Aeq} (16 hour) and night-time L_{Aeq} (8 hour) are presented in the table below:

Leq Noise Levels		
Position	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
A	54	49
B	56	45
C	56	53
D	54	44

The measured representative (10th highest) night-time (23:00 – 07:00) L_{max} noise levels are presented in the table below:

Night-time (23:00 – 07:00) Lmax Noise Levels	
Position	L_{max} Noise Levels
A	66
B	57
C	70
D	60

5.2 Noise Climate

At the time we were on site, the following noise sources were noted at each measurement location:

Position A

To the north of the site, pedestrian and road traffic noise from Chandos Road and its adjacent streets was dominant.

Position B

To the east of the site, the ambient noise levels were dominated primarily by two large acoustic louvres on the rooftop of 48-52 Montague Street.

Position C

To the south of the site, the primary noise source was from pedestrians on Montague Street making use of the commercial properties that are located along the street.

Position D

To the west of the site, the primary noise source was local road traffic movements.

The proposed development site is located within ~200 metres of the coastline, with noise from seagulls audible at all measurement positions whilst we were on site.

5.3 Representative Background Noise Levels

As mentioned, the measured daytime noise levels on the eastern boundary of the site were dominated by the noise emissions from the mechanical services plant on the rooftop of 48-52 Montague Street. For this reason, we have assessed the noise impact on the eastern side of the building (Position B) based upon the background noise level measurements undertaken on the western side of the building (Position D). The noise level measurements on the western side of the building were screened from and subjectively not affected by the noise emissions from the roof level plant on 48-52 Montague Street.

6.0 RELEVANT PLANNING POLICIES AND NOISE ASSESSMENT GUIDANCE

6.1 Permitted Development

The Town and Country Planning (General Permitted Development) (Amendment) Order 2021 provides details of permitted development in Part 3 of Schedules 2 – Class MA “commercial, business and service uses to dwelling houses.”

“MA. Development consisting of a change of use of a building and any lands within its curtilage from a use falling within Class E (commercial, business and service) of Schedule 2 to the Use Classes Order to a use falling within Class C3 (dwellinghouses) of Schedule 1 to that Order.”

As previously mentioned, the proposed development would create approximately 1500 sqm of commercial space (Use Class E) at ground, first, second and third floor levels. This would therefore create a new ‘commercial to residential’ separation between the proposed ground floor and any proposed residential apartment across the first floor. The proposed development would also create a ‘residential to residential’ separation between floors 1-2 and 2-3.

Following from this, it is therefore appropriate to ensure that any separating constructions between the differing uses provides an appropriate level of sound insulation.

Approved Document E (ADE) of the Building Regulations 2010 requires that party walls and separating floors between dwellings provide a reasonable resistance to sound. For dwellings created by a material change of use, ADE requires that party walls/separating floors maintain a minimum sound insulation performance of $D_{ntw} + C_{tr} 43$ for ‘residential to residential’ split. ADE also states that a higher standard of sound insulation may be required between spaces used of other purposes that are not residential.

Whilst ADE highlights the need for additional sound insulation between commercial and residential uses, it does not outline any guidance on appropriate uplift values.

It should also be noted that the future occupants of the proposed commercial spaces are currently unknown. As such, Quantum are unable to provide any quantitative advice regarding sound insulation uplift values.

Therefore, it is recommended that all separating floors are constructed to achieve the minimum sound insulation performance outlined in ADE, and if considered necessary, details of the finalised construction proposals for maintaining sound insulation between the differing use classes can be controlled and enforced through the use of a planning condition.

6.2 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010. The NPSE is the primary statement of noise policy for England and applies to all forms of noise other than occupational noise. The NPSE sets out the long-term vision of Government noise policy which is 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.

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

- avoid significant adverse impacts on health and quality of life;
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.”*

The Explanatory Note to the NPSE introduces guidance to assist in defining the adverse impacts:

NOEL – No Observed Effect Level

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

LOAEL – Lowest Observable Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

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

These categories are further discussed in the Planning Practice Guidance section below.

The NPSE acknowledges that it is not possible to have a single objective noise level-based measure that is mandatory and applicable to all sources of noise in all situations.

6.3 Planning Practice Guidance

The government’s Planning Practice Guidance is a web-based resource and provide advice on various issues, including noise (<https://www.gov.uk/guidance/noise--2>). The advice (March 2014, latest update July 2019) states in the context of considering when noise is relevant to planning, “noise needs to be considered when new development may create additional noise,

or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced).”

The Planning Practice Guidance pages also include more explanation of the effect level categories noted above, providing an explanatory Noise Exposure Hierarchy Table, which explores how actions such as a requirement for noise mitigation, or prevention of a development, might be assessed with respect to whether noise levels are considered above the category thresholds.

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour and/or attitude, e.g., avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g., regular sleep deprivation/awakening; loss of appetite, significant, medically definable hard, e.g., auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

6.4 National Planning Policy Framework

The following paragraph is from the National Planning Policy Framework (NPPF). The NPPF was revised in July 2021.

“185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effect (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.”*

...

“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.”

6.5 BS8233:2014

We understand it is required that internal noise levels of the development comply with BS8233. This is in line with likely Local Authority expectations and our recommendation is to base internal noise criteria on the latest 2014 document.

Guideline values for dwellings with respect to internal and external noise levels are included in BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (BSi).

The standard states 50 dB $L_{Aeq,T}$ as being desirable as a steady state noise level not to be exceeded in gardens. It also states 55 dB $L_{Aeq,T}$ as an upper guideline value. The time period T is usually taken to be the 16-hour day (07:00h to 23:00h).

Paragraph 7.7.3.2 of the standard goes on to say the following:

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.

“Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

External noise levels, especially on small balconies to apartment blocks, are not proposed to be a controlling index by which suitability of a residential site is defined.

Therefore, when designing noise sensitive developments that incorporate gardens or other external amenity areas, the intent shall be to provide an area for each property in which the noise levels are consistent with these standards. Where these standards cannot be achieved, then reasonable measures shall be employed to provide screening or other forms of mitigation so as to minimise the noise levels in the external amenity areas.

An important principle here is that sustainable development sites will often be exposed to relatively high levels of environmental noise, and while means are available to insulate internal spaces, they are not always available to protect external spaces. Strict adherence to the enforcement of such external noise criteria would preclude development in the majority of areas considered for development in semi-urban or urban environments or in areas in the vicinity of transportation noise sources. This is why the external standards shall be viewed as targets or triggers of mitigation measures rather than thresholds not to be exceeded in all circumstances.

Buildings can be designed to achieve specific levels of insulation against external noise. It is reasonable, therefore, to set specific internal noise standards as the test of whether a development satisfies the requirements of the NPPF and the aims of the NPSE. In essence, these require a high-quality design that achieves a good standard of amenity.

Guidance in respect of indoor ambient noise levels is contained in Table 4 of BS 8233:2014 and tabulated below:

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq, 16h}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq, 16h}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq, 16h}$	30 dB $L_{Aeq, 8h}$

Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

The previous edition of BS 8233 included quantitative guidance with respect to night-time L_{Amax} noise levels in bedrooms. BS 8233:2014 does not provide such guidance, however in paragraph 7.7.5.1.1 it is noted that the recommendations for ambient noise in hotel bedrooms are similar to those for living accommodation and Table H.3 in Annex H.3 gives example night-time L_{Amax} limits in hotel bedrooms of 45-55 dB.

The WHO study informing the 1999 Guidelines derived the L_{Amax} night-time noise standard on the basis of 10 to 15 occurrences per night.

6.6 Local Planning Authority – Plant Noise

The ‘Planning Noise Advice Document: Sussex’ provides advice for developers and consultants to assist in making a planning application in West Sussex with regards to noise. For “Recommended noise thresholds at the most sensitive noise receptors”, it states:

“1. The rating level of plant, where practicable, shall be no greater than the existing background sound levels when measured in accordance with BS 4142.”

6.7 Design Guidance – BS 4142: 2014 + A1: 2019

As noted, The Planning Noise Advice Document: Sussex makes specific reference to BS 4142:2014 + A1: 2019: “Methods for Rating and Assessing Commercial and Industrial Sound”. This standard provides a rating and assessment methodology for assessing the potential adverse impact of commercial noise sources on neighbouring dwellings and is reference in documents supporting the Government's planning practice guidance on noise.

The assessment procedure initially compares the ‘Rating Level’ of the source with the ‘Background Noise Level’ when the source is not present.

The ‘Rating Level (L_{Ar})’ referred to is the specific noise level of the noise source under investigation (in terms of the L_{Aeq} noise index), to which corrections are applied if the noise has certain audible characteristics. The table below summarises the corrections to be applied based on a subjective assessment of noise source characteristics.

Character Correction				
Feature / Perception	Tonality	Impulsivity	Intermittency	Other Acoustic Characteristics
Just perceptible	+2dB	+3dB	+3dB	+3dB
Clearly perceptible	+4dB	+6dB	When the specific sound has identifiable on/off conditions that are readily distinctive	
Highly perceptible	+6dB	+9dB		

The 'background noise level' (L_{A90}) represents the noise level that is exceeded for 90% of the stated measurement period. For assessment purposes, the background noise level needs to be determined without the noise source under investigation operating.

The time of operation needs to be taken into account. During the day (normally taken to be as 07:00 – 23:00) a one-hour measurement period is considered appropriate. During the night (normally taken to be 23:00 – 07:00) a 15-minute time period is normally used.

The following guidance is then offered based on the outcome of this initial assessment:

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

7.0 COMMERCIAL NOISE SOURCES

For the prior notification application, it is only necessary to consider noise impact from commercial noise sources on the proposed residential dwellings.

We have identified the following surrounding commercial noise sources.

7.1 Northeast of Site (Ground Floor Level)

To the northeast of the site, there are five condenser units located on the east facing wall of 56 Montague Street at ground floor level. The location and specification of the plant can be seen below:



Figure 3. Northeast Plant Location (Google Imagery 2023, The Geoinformation Group)

Manufacturer/Model	No. of Units	Sound Pressure Level @ 1m dB(A)
Fujitsu AOYG90LRA	5	57

We understand the plant in this area is proposed to be relocated or appropriately treated to adhere with the local authority plant noise emission criteria.

7.2 West of Site (1st Floor Level)

There are two condenser units located near the existing external 1st floor stairwell of the western elevation of the site. The location of the plant can be seen in the following image:



Figure 4. Western Plant Location (Google Imagery 2023, The Geoinformation Group)

Area	Manufacturer/Model	Sound Pressure Level dB(A) @ 1m
1	Daikin RYP71B7W1	52
2	Daikin RZQ71B7V3B	49

We understand the plant in this area is proposed to be relocated or appropriately treated to adhere with the local authority plant noise emission criteria.

7.3 Rear Of 60-64 Montague Street (Ground Floor Level)

To the west of the site at ground level there are several small condenser units fixed to the rear of the buildings located at 60, 62 and 64 Montague Street.



Figure 5. Rear of 60-64 Montague Street Plant Locations (Google Imagery 2023, The Geoinformation Group)

Area	Manufacturer/Model	Sound Pressure Level dB(A) @ 1m	Address
1	Toshiba RAV-GM1101AT8P-E	63	60 Montague Street (Holland & Barrett)
	Toshiba RAV-SM563AT-E	48	
2	Mitsubishi PUHZ-RP140YKA	52	62 Montague Street (Tui)
	Daikin RXP50M2V1B	49	
3	Panasonic U-200PZH2E8	61	64 Montague Street (Mami Restaurant)

We understand the plant in this area is proposed to be relocated or appropriately treated to adhere with the local authority plant noise emission criteria.

7.4 48-52 Montague Road Roof Plant (East of Site)

48-52 Montague Street is located to the east of the application site and is occupied by the retailer/chemist, Boots UK Ltd. The 3rd floor roof of 48-52 Montague Street has various mechanical services plant items on it including small condenser units and two south facing ventilation louvres which are highlighted in the following image:



Figure 6. Plant Located at 48-52 Montague Street (Google Imagery 2023, The Geoinformation Group)

Whilst on the 2nd floor roof of 56 Montague Street at measurement Position B, it was noted that the dominant noise sources on the 48-52 Montague Street roof were the two south facing ventilation louvres. The noise survey data for Position B indicates that these noise sources turn

on at 08:00 hours and turn off at 16:15 hours. The turning off of the ventilation plant at 16:15 hours was witnessed by us on Friday 9th February 2024. We understand the small condenser units are not limited in their hours of operation.

7.5 Deliveries To The Rear Of 60 to 64 Montague Street

Whilst on the 2nd floor roof of 56 Montague Road on the afternoon of 9th February 2024, we witnessed a small van unloading to the rear of 60 Montague Street. The noise levels generated by this activity were not audible above the background noise level.

7.6 Deliveries To Poundland (56 Montague Street)

The ground floor retail unit delivery bay is on the eastern elevation as shown in the following image:

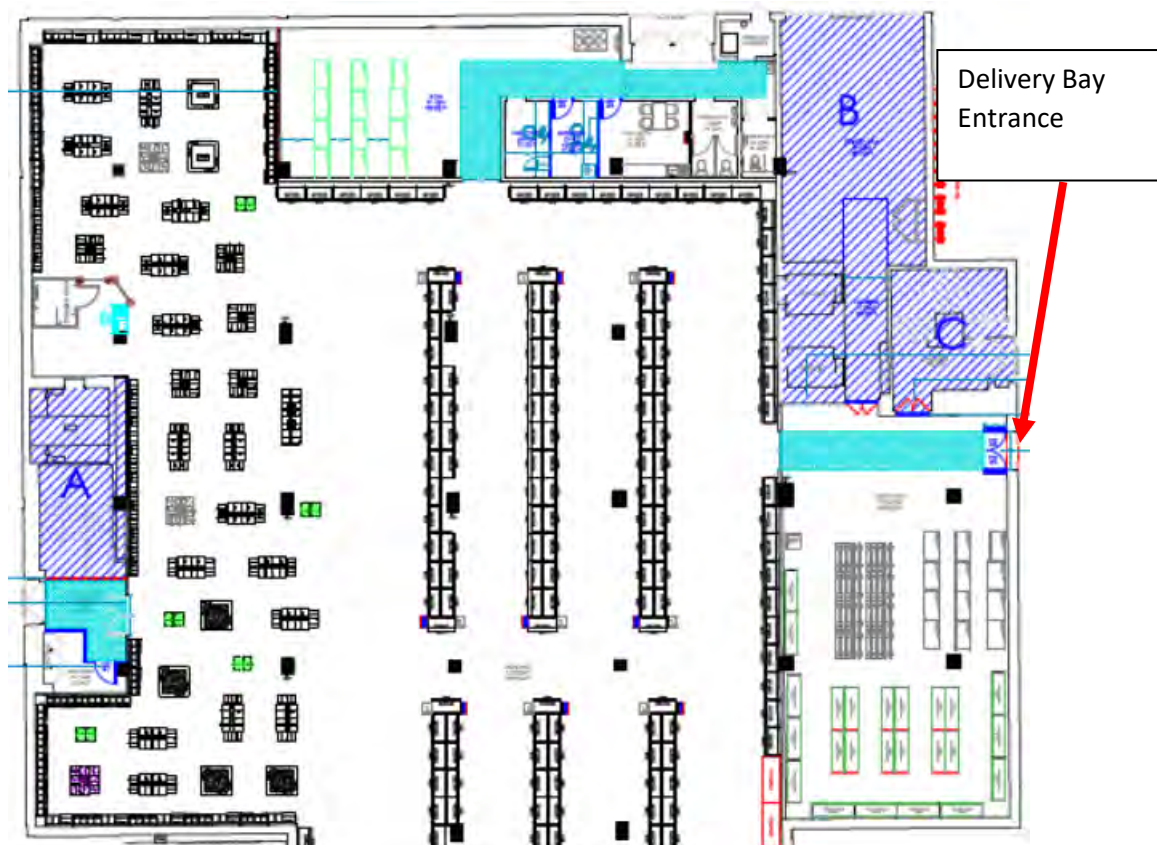


Figure 7. Proposed Location of New Loading Bay

We understand stock deliveries to the ground floor retail unit, Poundland, are restricted to the normal store opening hours (store opening hours 8am-6pm Mon to Sat, 10am-4pm Sun according to Poundland website).

We understand the delivery vehicles park on Chandos Road. The existing residencies on Chandos Road, opposite the rear of 56 Montague Street are already exposed to any associated delivery noise.

The proposed residencies on the eastern elevation are set back from the ground floor façade/loading bay doors, limiting the line of sight to the loading bay and the passageway leading from Chandos Road.

Given the context of the site, i.e. mixed residential/retail area, it is not unreasonable for any future occupants of the proposed residential apartments to expect occasional daytime only deliveries to occur to the ground floor retail unit.

8.0 COMMERCIAL NOISE ASSESSMENT

8.1 Assessment Methodology

The '*Planning Noise Advice Document: Sussex*' states that the rating level of mechanical services plant shall be no greater than the existing background sound levels when measured in accordance with BS 4142. This would ensure a sound source (the plant) has a "low impact". We have therefore based our noise assessment on this methodology.

In accordance with BS 4142: 2014, the measured modal background L_{90} noise levels have been considered the representative background noise levels at each measurement position.

8.2 48-52 Montague Road Roof Plant Noise Emissions

The measured daytime noise levels on the eastern boundary of the site were dominated by the noise emissions from the mechanical services plant on the rooftop of 48-52 Montague Street. For this reason, we have assessed the noise impact on the eastern side of the building (Position B) based upon the background noise level measurements undertaken on the western side of the building (Position D). The noise level measurements on the western side of the building were screened from and subjectively not affected by the noise emissions from the roof level plant on 48-52 Montague Street.

BS 4142: 2014 requires the plant noise level to include corrections for acoustic features such as tonal or intermittent noise to determine the plant noise Rating level. As the roof plant does not run continuously, an intermittency penalty of +3dB(A) will be applied. The plant noise measurements indicate that the plant noise is not tonal.

The table below presents our proposed Plant Noise Level limits at the proposed apartment windows (including a -3dB correction for plant noise intermittency).

Proposed Plant Noise Level Limit at Apartment Window, dB(A)		
Apartment Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Level 1-2 West Elevation	46	38
Level 1-2 East Elevation	46	38
Level 1-3 North Elevations	47	38
Level 3 West, South & East Elevations	46	38

A noise map has been developed to determine the likely incident noise levels on the proposed residential development from the existing roof plant on 48-52 Montague Street. The calculated plant noise levels on the proposed residential development are presented in the following images.

The extent of the proposed residential elevations that are likely to comply with the proposed plant noise emission limit / plant noise rating level have been highlighted in green. The extent of the proposed residential elevations that are not likely to comply with the proposed plant noise emission limit / plant noise rating level have been highlighted in yellow / red.

1st Floor

Daytime Leq



Night Time Leq

**2nd Floor**

Daytime Leq



Night Time Leq

**3rd Floor**

Daytime Leq



Night Time Leq



9.0 MITIGATION MEASURES

Our assessment indicates that plant noise levels are likely to exceed the proposed plant noise emission criteria outside of the following proposed apartments.

- 1st Floor – Apartments 112, 113 and 114
- 2nd Floor – Apartment 201
- 3rd Floor – Apartments 301, 302 and 303

As stated in section 7.0, the plant fixed to both the northeast, west elevations and the rear of 60-64 Montague Street are proposed to be appropriately attenuated and/or relocated. This will ensure the plant will adhere to the local authority plant noise emission criteria.

To note, the noise modelling analysis indicates that the noise level at apartment 211 on the 2nd floor, resulting from the plant units on the roof of 48-52 Montague Street, is estimated to be

46.5 dB. This level slightly exceeds our proposed plant noise limit, with an increase of just 0.5 dB over the established threshold. Considering that this deviation is minimal, we believe that mitigation measures are not necessary for this particular apartment.

With regards to the plant items on the roof of 48-52 Montague Street, it may not be possible to apply noise mitigation measures at the source.

If this is the case, enhanced noise mitigation measures could be proposed in the design of the proposed apartments.

With windows closed, standard double glazing (i.e. Rw33 dB +) and suitably specified trickle ventilators should be sufficient to ensure suitable internal noise levels (i.e. levels detailed in BS8233: 2014, Table 14) are achievable in all apartments. However, sound insulation of windows will only be effective when they are closed.

Where opening windows in the above apartments is required to overcome summertime overheating, we would recommend additional mitigation in the form of mechanical ventilation or cooling to reduce the reliance on opening windows.

Potential options include:

- MVHR mechanical ventilation;
- 'Boosted' mechanical ventilation (either increased rate of MVHR or standalone boost fans);
- 'Peak lopping' modules added to MVHR; and

If a mechanical approach to thermal control is proposed, early consideration will also need to be given to noise generated by the mechanical systems to ensure this is appropriately controlled. This will be especially true if ductwork systems need to handle high air volumes which could create air generated noise if flow velocities are not reasonably controlled.

The floor which separates the proposed apartments and ground floor retail unit will be required to provide an appropriate level of sound insulation. As a minimum, it will have to achieve the minimum sound insulation required by the Building Regulation Approved Document E.

ADE also states that a higher standard of sound insulation may be required between spaces used for other purposes that are not residential.

Whilst ADE highlights the need for additional sound insulation between commercial and residential uses, it does not outline any guidance on appropriate uplift values.

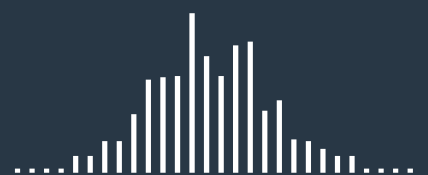
10.0 CONCLUSION

Environmental noise level surveys have been undertaken at 56 Montague Street, Worthing.

The results have been used to assess the suitability of the site for residential purposes, in accordance with relevant national and local planning / guidance.

In accordance with the Town and Country Planning Act (General Permitted Development) (Amendment) Order 2021, impacts of noise from commercial premises on the intended occupiers of the development have been assessed.

The assessment indicates a low impact on the majority of the proposed apartments. Provided mitigation measures are implemented on the apartments which we have determined are likely to be impacted by commercial noise, our assessment indicates that the proposed residential development at 56 Montague Street does not raise any unacceptable noise impact concerns.



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Appendix C – Condenser unit schedule.

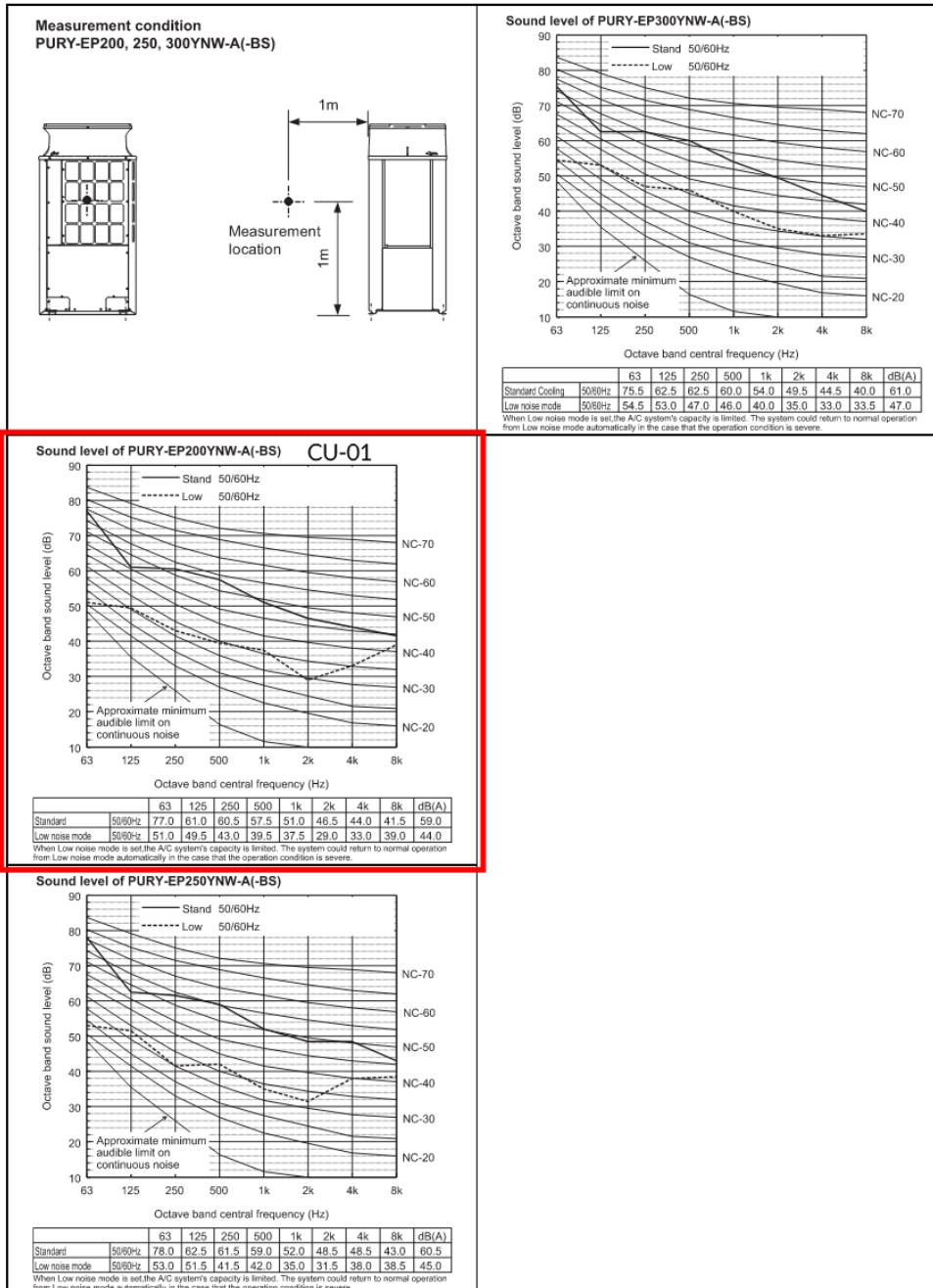
REF	AREA SERVED	INDOOR UNIT REF	MODEL REFERENCE	VOLTAGE	POWER INPUT	START (A)	RUN (A) (MAX)	DIMENSIONS			WEIGHT	SOUND PRESSURE LEVEL	SOUND POWER LEVEL	MAX PIPE RUN	APPROX PIPE RUN
				(V/ph/Hz)	(kW)			WIDTH	DEPTH	HEIGHT					
								(mm)	(mm)	(mm)	(kg)	(dBA)	(dBA)	(m)	(m)
CU-01	BoH AREAS	AC-01	PURY-EP200YNW-A2	380-415 / 3 / 50	8.47 / 3.7	8.0	16.1	920	740	1858	219	59	76	110	57
		AC-02													65
		AC-03													69
		AC-05													84
		AC-06													93
		AC-07													53
CU-02	COMMS	AC-04	PUZ-ZM100VDA	220-240 / 1 / 50	2.54 / 2.07	11.9	27.1	1100	460	870	107	48 / 44	63	100	74
CU-03	SALES	AC-08	PUZ-ZM250YKA2	380-415 / 3 / 50	6.43 / 6.13	5.0	22.5	1050	330	1338	138	62 / 59	-	100	51
		AC-09													52
CU-04	SALES	AC-10	PUZ-ZM250YKA2	380-415 / 3 / 50	6.43 / 6.13	5.0	22.5	1050	330	1338	138	62 / 59	-	100	42
		AC-11													42
CU-05	SALES	AC-12	PUZ-ZM250YKA2	380-415 / 3 / 50	6.43 / 6.13	5.0	22.5	1050	330	1338	138	62 / 59	-	100	33
		AC-13													35
CU-06	SALES	AC-14	PUZ-ZM250YKA2	380-415 / 3 / 50	6.43 / 6.13	5.0	22.5	1050	330	1338	138	62 / 59	-	100	23
		AC-15													25
CU-07	SALES	AC-16	PUZ-ZM250YKA2	380-415 / 3 / 50	6.43 / 6.13	5.0	22.5	1050	330	1338	138	62 / 59	-	100	29
		AC-17													31
CU-08	SALES	AC-18	PUZ-ZM250YKA2	380-415 / 3 / 50	6.43 / 6.13	5.0	22.5	1050	330	1338	138	62 / 59	-	100	50
		AC-19													45

Appendix D – Manufacturer's information – Condenser units.

5. SOUND LEVELS

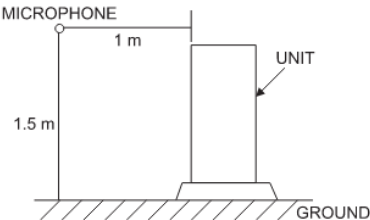
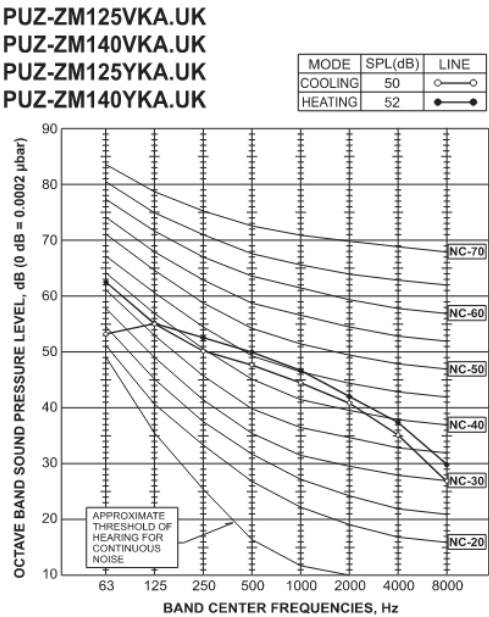
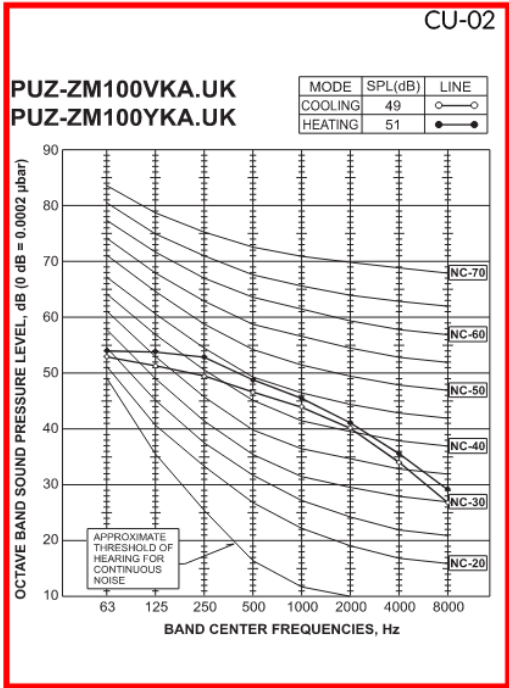
Outdoor units

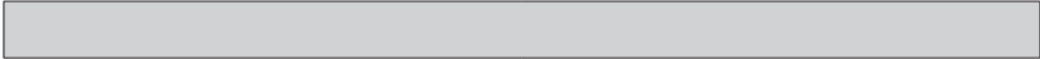
5-1. Sound levels in cooling mode



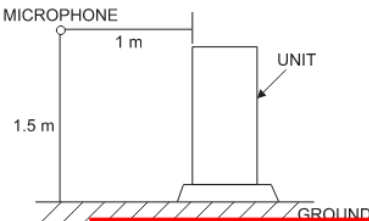
• Depending on the operation conditions, the unit generates noise caused by valve actuation, refrigerant flow, and pressure changes when operating normally. Please consider to avoid location where quietness is required.
For BC controller, it is recommended to be installed in places such as ceilings of corridor, rest rooms and plant rooms.

5-3. NOISE CRITERION CURVES



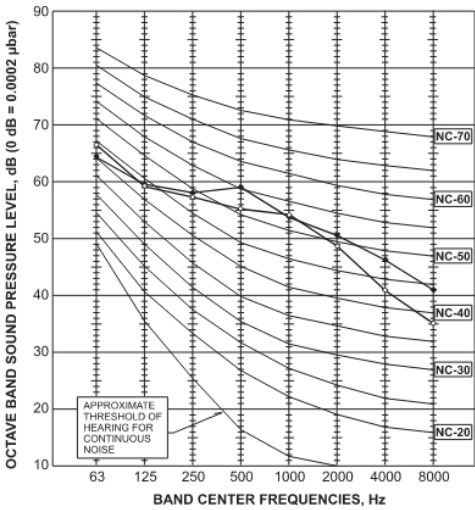


5-4. NOISE CRITERION CURVES



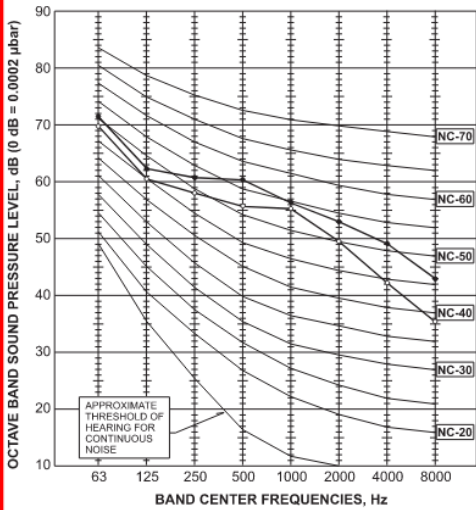
PUZ-M200YKA.UK

MODE	SPL(dB)	LINE
COOLING	58	○—○
HEATING	60	●—●



CU-03, 04, 05, 06, 07
PUZ-M250YKA.UK & 08

MODE	SPL(dB)	LINE
COOLING	59	○—○
HEATING	62	●—●



Appendix E – Manufacturer’s information – AHU.

REF	LOCATION	SYSTEM	MODEL	SERVICE TYPE	REQUIRED DUTY		CONNECTIONS				HEAT EXCHANGER	ELECTRICAL DETAILS:			WIDTH (mm)	LENGTH (mm)	HEIGHT (mm)	WEIGHT (kg)
					FLOW (m3/s)	PD (Pa)	INLET (mm)		OUTLET (mm)			POWER (kW)	VOLTAGE (V/ph/Hz)	FLC (A)				
AHU-01	ROOF	SALES FLOOR & FITTING ROOM	Non-standard	SUPPLY	1.4751	148	700	700	700	700	Thermal wheel	4.6	400/3/50	6	1588	2960	1760	705
				EXHAUST	1.2012	88	700	700	700	700		3.5		4.4				

DESCRIPTION SUPPLY	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	OVERALL dB(A)
OUTLET SOUND POWER (dB)	NO DATA	76	81	80	79	76	72	72	84
INLET SOUND POWER (dB)	NO DATA	67	69	67	57	51	44	45	67
CASE BREAKDOWN SOUND POWER (dB)	NO DATA	59	54	42	40	43	40	32	50

DESCRIPTION EXHAUST	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	OVERALL dB(A)
OUTLET SOUND POWER (dB)	NO DATA	78	82	79	79	75	71	72	83
INLET SOUND POWER (dB)	NO DATA	72	72	70	60	51	43	45	69
CASE BREAKDOWN SOUND POWER (dB)	NO DATA	62	55	41	39	42	39	33	51



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