



The Arch Company Properties
Limited

Arch 77 Whitworth Street, Manchester

Noise Assessment

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Executive Summary

Air & Acoustic Consultants Limited have been commissioned by The Arch Company Properties Limited to undertake a noise impact assessment in support of planning application at railway arch 77, Whitworth Street in Manchester.

The planning application will focus on a material alteration and full refurbishment for E class uses drinking establishment with expanded food provision (*sui generis*).

The assessment has considered the reasonable worst-case impacts as a result of noise from the general operations of vehicles servicing the proposed site and this is based upon estimated traffic movements for vehicles servicing the existing units, along with a considering possible entertainment noise from outdoor seating.

This application does not include any provision for the installation of any plant or equipment associated with the end use of the units and should the end user require any plant or equipment this would be subject to a separate submission.

The assessment has considered the reasonable worst-case impacts of noise from the general operations of the unit including vehicle movements and unloading operations associated with the proposed use. The predicted noise rating levels at all of the noise sensitive receptors during the day and night are less than the assessment criterion level of not more than 5 dB above the background sound level.

Further to this, the average noise levels as a result of the operational development are generally below the existing background noise level on except for receptor R02 at night where under the worst-case conditions the noise rating level could be up to 1 dB above the background noise level.

The assessment has included a consideration of the site-specific context, and it is not considered likely that the existing receptors will experience any adverse impacts as a result of the operational development.

During the night-time period, predicted maximum noise events levels at the facades of all receptors are significantly lower than the 60 dB(A) WHO criterion threshold and there are not likely to be any adverse impacts.

It can be concluded that the proposed development has been considered in line with the appropriate standards and guidance and the result show that noise from the operational development is unlikely to conflict with national, regional, and local planning policies and the impacts can be classified as less than the LOAEL.

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1 Introduction

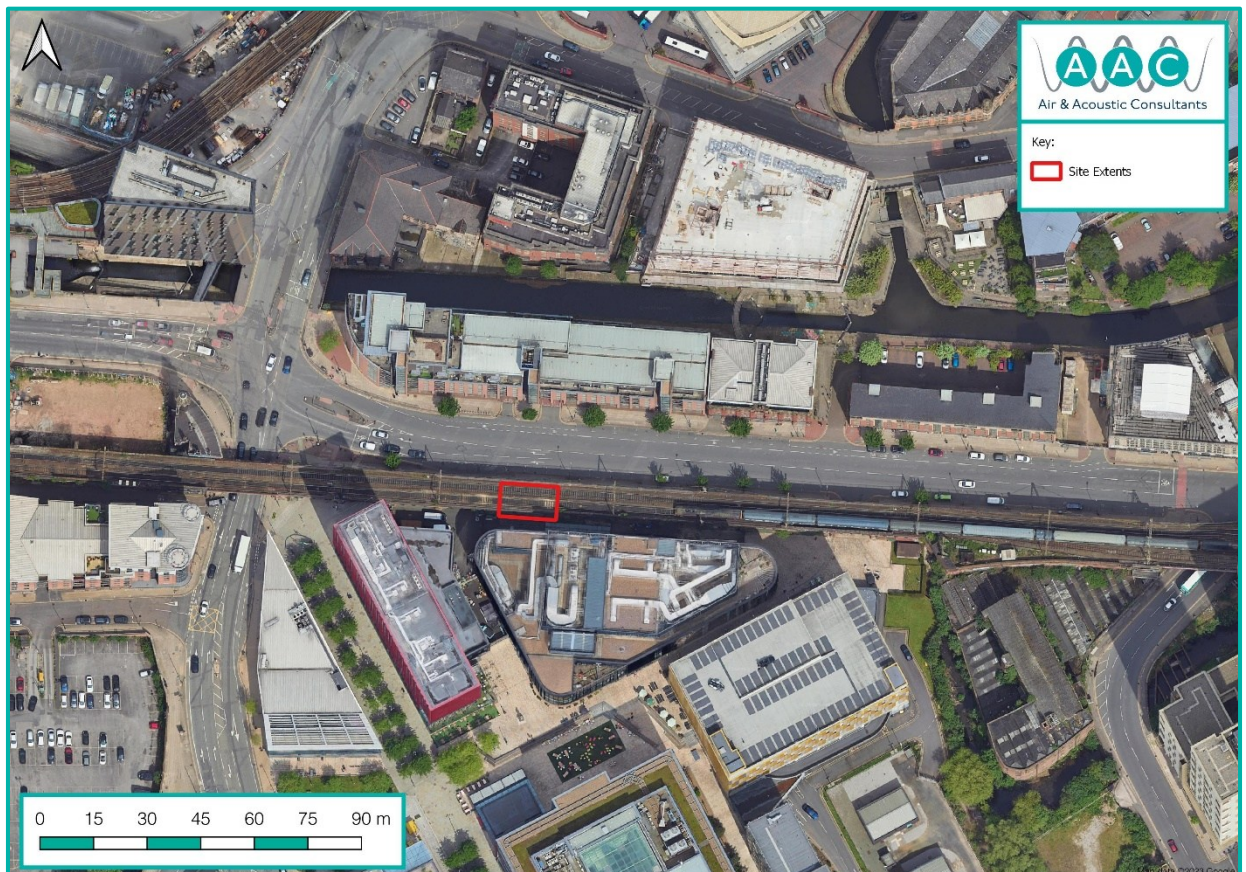
1.1 Brief

- 1.1.1 Air & Acoustic Consultants Limited have been commissioned by The Arch Company Properties Limited to undertake a noise impact assessment in support of a planning application for a proposed change of use of railway arch 77, Whitworth Street, Manchester M1 6LG.

1.2 Application Site

- 1.2.1 The property is located 300 yards to the west of from Oxford Road Train Station, adjacent to the First Street / HOME development. Manchester City Council (MCC) own the four arches on either side of the proposed arches and are currently onsite completing full refurbishment for Class E uses drinking establishment with expanded food provision (sui generis).
- 1.2.2 The front elevation consists of a single glazed shop front with double doors and an electric roller shutter. Internally, the property is split across ground floor and basement level. The suspended timber floor and timber frame mezzanine are in poor condition and require full replacement. The lining is in a reasonable condition with discolouring/damage to some localised areas. There is a secondary means of escape to the rear of the basement level which is currently unusable due to HOME development backfilling against the fire escape door and installing a ramp. There is an existing WC however, this will require removal given that it is positioned on the suspended timber floor which is not safe to retain.
- 1.2.3 The National Grid Reference for the centre of the site is, SJ 83703 97492 (British National Grid Coordinates E: 383703, N: 397492). The site location and surrounding area are shown in [Figure 1.1](#).

Figure 1.1: Site Location



1.3 Development Proposals

1.3.1 The development description is as follows:

“Change of use for an open Class E (Commercial, Businesses and Services) and drinking establishments with expanded food provision with associated access and parking, along with external and internal refurbishment works including façade treatments at Arch 77 Whitworth Street West, Manchester, M1 5WQ.”

1.3.2 The arch has historical use as retail, repair and storage of motorcycles between 2016 and 2019. Prior to that, there was a licence between 2013 and 2014 for A1/B8 use class. Google streetview indicates the property had previously been used as an estate agent in 2007.

1.3.3 The property is anticipated to attract demand from a range of Class E uses especially, retail and F&B operators and therefore planning consent is required for the change of use to open E uses and material alterations to the frontage.

1.3.4 A previous material alterations planning application was previously submitted in November 2022 and was rejected in February 2023. The application was refused on the basis that the LPA disagreed with the proposed works to the frontage which consisted of retaining and altering the existing infill to for new emergency doors. In June 2024, new proposals were discussed for the arch with the Principle Planning Manager at MCC, who was supportive and recognised the limitations of the project budget when designing the frontage. MCC also indicated that Whitworth Street has become a priority for the Council as highlighted by their investment in the neighbouring arches.

1.3.5 The full proposed material alterations are listed as follows:

- Replace existing front infill with new glazed infill (in line with LPA approved design at Corporation Street but with louvering to the rear);
- Repairs to existing rear infill;
- Replacement of mezzanine and staircase;
- Installation of fire corridor;
- Patch repair to floor slab;
- Patch repair and spray paint existing lining;
- Install LED lighting;
- Allowance for works to existing water and gas supplies;
- Allowance for works to drainage including installing pop up for WC; and;
- Install three phase electricity supply.

1.4 Assessment Scope

1.4.1 This assessment will assess the potential noise impacts of the proposed industrial / commercial uses on the nearby noise sensitive residential properties. At this time there are no specific end users for the units so only general noise sources can be assessed, as opposed to specific noise sources.

1.4.2 To assist with the understanding of this report a glossary of acoustic terms is provided in [Appendix A](#).

2 Legislation and Policy Context

2.1 Introduction

- 2.1.1 The prediction and assessments of the likely noise impacts associated with the proposed development have been completed using the relevant legislation policy and guidance concerning noise, which are discussed in turn below.

2.2 National Planning Policy Framework (NPPF)¹

- 2.2.1 The NPPF sets out the Government's planning policy for England, to help achieve sustainable development within the planning sector, and that the planning system has three overarching objectives, one of which (Paragraph 8c) is an environmental objective:

"To protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".

- 2.2.2 The NPPF addresses noise as a planning issue primarily through the statements in paragraphs 180 and 191. It is also noted that paragraph 193 is also linked to noise through the agent of change principle.

- 2.2.3 Paragraph 180 states:

'Planning policies and decisions should contribute to and enhance the natural and local environment by:'

'e) 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.'

- 2.2.4 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 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 amenity value for this reason;'

- 2.2.5 Paragraph 193 states:

'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

¹ Department of Levelling Up, Housing & Communities, 2023. *National Planning Policy Framework*.

'agent of change') should be required to provide suitable mitigation before the development has been completed.'

- 2.2.6 The NPPF refers to the Noise Policy Statement for England (NPSE) for advice on the achievement of these policy aims, and particularly in connection with the explanation of 'adverse impacts'.

2.3 Noise Policy Statement for England (NPSE)²

- 2.3.1 The NPSE is the overarching government policy on noise. It seeks to clarify the underlying principles and aims in past and existing policy documents, legislation, and guidance in relation to all forms of noise including environmental noise, neighbour noise, and neighbourhood noise (but not noise in the workplace).

- 2.3.2 It uses the established concepts of No Observed Effect Level, (NOEL) and Lowest Observed Adverse Effect Level, (LOAEL). The NPSE extends these by introducing Significant Observed Adverse Effect Level, (SOAEL). This is the level above which significant adverse effects on health and quality of life occur. However, the explanatory note to the NPSE states that it is not possible to identify a single objective value to define SOAEL for noise that is applicable to all sources of noise in all situations. It is likely to be different for different noise sources, for different receptors and at different times.

- 2.3.3 The NPSE's vision 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.'

This long-term vision is supported by the following aims:

- *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, through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.'*

- 2.3.4 The second aim of the NPSE refers to noise impacts that lie somewhere between LOAEL and SOAEL. The NPSE asserts that, while this means that all reasonable steps should be taken to mitigate and minimise adverse effects, this does not mean that such adverse effects cannot occur.

2.4 Planning Practice Guidance (Noise)³

- 2.4.1 The Government has published Planning Practice Guidance on a range of subjects including noise. The guidance forms part of the NPPF and provides advice on how to deliver its policies. The Planning Practise Guidance (PPG) (Noise) reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards and contains examples of acoustic environments commensurate with various effect levels.

- 2.4.2 Paragraph 006 of (Reference ID: 30-006-20190722) of the PPG (Noise) explains that:

'The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.'

² Department for Environment, Food and Rural Affairs. 2010. *Noise Policy Statement for England*.

³ Department for Levelling Up, Housing and Communities and Ministry of Housing Communities and Local Government. 2019. *Planning Practice Guidance Noise*.

2.4.3 The guidance contained within the PPG (Noise) provides advice on how to deliver the policies of the NPPF. The PPG (Noise) reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards and contains examples of acoustic environments commensurate with various effect levels. Paragraph: 004 Reference ID: 30-004-20190722 of the PPG (Noise) describes the different effect levels which are defined and briefly outlined below:

- No Observable Effect Level (NOEL);
- Lowest Observable Adverse Effect Level (LOAEL); and
- Significant Observed Adverse Effect Level (SOAEL).

2.4.4 The PPG (Noise) describes noise that is not noticeable to be at levels below the NOEL. Noise exposures in this range are below the LOAEL and no mitigation is required. The PPG (Noise) suggests that noise exposures above the LOAEL cause small changes in behaviour. Examples of noise exposures above the LOAEL provided in the PPG (Noise) are having to turn up the volume on the television; needing to speak more loudly to be heard; or, where there is no alternative ventilation, closing windows for some of the time because of the noise. In line with the NPPF and NPSE, the PPG (Noise) states that consideration needs to be given to mitigating and minimising effects above the LOAEL, but also to take account of the economic and social benefits being derived from the activity causing the noise. The PPG (Noise) suggests that noise exposures above the SOAEL cause material changes in behaviour. Examples of noise exposures above the SOAEL provided in the PPG (Noise) are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. In line with the NPPF and NPSE, the PPG (Noise) states that effects above the SOAEL should be avoided and that whilst the economic and social benefits derived from the activity causing the noise must be taken into account, such exposures are undesirable.

2.4.5 The non-numeric guidance contained within the PPG (Noise), based upon the starting point in the NPSE, is summarised in [Table 2.1](#) below.

Table 2.1: Summary of Guidance from NPSE and PPG (Noise)

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Adverse Effect Level			
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable 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			
Noticeable 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. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			

Perception	Examples of Outcomes	Increasing Effect Level	Action
Noticeable 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
Noticeable 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 harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

- 2.4.6 In line with the NPPF and the NPSE, the guidance confirms that significant adverse effects should be avoided. At the next level down in the hierarchy, where there is an observed adverse effect, the PPG (Noise) confirms that effects should be mitigated and reduced to a minimum (as far as reasonably practicable). No mitigation measures are required for effects that are considered to be below the lowest observed adverse effect level (LOAEL).
- 2.4.7 However, along with the NPSE it does not provide any numerical definition of the NOEL, LOAEL and SOAEL.
- 2.4.8 The NPSE refers to the World Health Organisation (WHO) when discussing noise impacts. The WHO Guidelines for Community Noise, (1999) suggest guideline values for internal noise exposure which take into consideration the identified health effects and are set based on the lowest effect levels for the general population. Guideline values for amenity which relate to external noise exposure are set at 50 or 55 dB(A), representing daytime levels below which most of the adult population will be protected from becoming moderately or seriously annoyed respectively.

2.5 Local Planning Policy

[Manchester Core Strategy 2012 - 2027⁴](#)

- 2.5.1 Manchester's Core Strategy was adopted on the 11 July 2012 and is the key document in the Manchester Local Plan. It sets the out the long-term strategic policies for Manchester's future development and forms the framework that planning applications are assessed against. It contains the following policies relating to noise and this specific project.
- 2.5.2 Policy C 10 Leisure and the Evening Economy:

"New development and redevelopment that supports the evening economy, contributes to the vitality of district centres and supports a balanced and socially inclusive evening/night-time economy will be permitted, subject to the following considerations:

1. *Cumulative impact – in areas where there is already a concentration of bars (A4), hot food takeaways (A5) and other night-time uses which are detrimental to the character or vitality and viability of the centre, there will be a presumption against further facilities.*

⁴ Manchester Core Strategy 2012 to 2027.

2. *Residential amenity – the proposed use should not create an unacceptable impact on neighbouring uses in terms of noise, traffic and disturbance.*
3. *Balance - new uses in Manchester centres should support both the day-time and evening/night-time economies whilst not undermining the role of the primary shopping area.*

When considering the impact of a proposed bar or hot food take away regard will be had to the above policy and also:

- *The existing number of similar establishments in the immediate area and their proximity to each other;*
- *The type and characteristics of other uses, such as housing, shops and public houses;*
- *The existence of vacant shop units and the condition of the unit;*
- *The importance of the location for local shopping, and the number, function and location of shops that would remain to serve the local community;*
- *The character of the centre and its frontage, and the nature of the use proposed;*
- *The potential impacts of the proposal on the wider community; and*
- *Any known unresolved amenity, traffic or safety issues arising from existing uses in the area."*

3 Assessment Approach

3.1 Construction Impacts

[BS5228-1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites. Part 1: Noise⁵](#)

- 3.1.1 The activities associated with the construction phase of the consented development has the potential to generate noise which may have an adverse impact on the surrounding area.
- 3.1.2 Guidance on the prediction and assessment of noise from development sites is given in British Standard BS 5228 -1:2009 + A1:2014 (BS 5228-1).
- 3.1.3 Construction noise can have disturbing effects on the surrounding neighbourhood. The effects are varied and are complicated further by the nature of the site works, which will be characterised by varied noise sources which will change location throughout the construction works. The duration of site operations is also an important consideration. Higher noise levels may be acceptable if it is known that the levels will only occur for a limited period.
- 3.1.4 BS:5228-1 provides guidance on significance criteria for assessing the potential noise impacts associated with the construction phase of projects. There are two methods specified; the ABC method and the 5 dB(A) change method.
- 3.1.5 The ABC method involves categorising receptors using the ambient sound level they experience, using the method and categories outlined in [Table 3.1](#).

Table 3.1: BS 5228-1 ABC Method

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
	Category A ^A	Category B ^B	Category C ^C
Night-time (23:00-07:00)	45	50	55
Evenings and weekends	55	60	65
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75
Notes: 1) A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level 2) If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise. 3) Applied to residential receptors only			
^A Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. ^B Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. ^C Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values. ^D 19:00-23:00 weekdays, 12:00-23:00 Saturdays and 07:00-23:00 Sundays			

- 3.1.6 The 5 dB(A) change method assesses the change in noise levels as a result of the construction works. It states;

⁵ BSI. *BS 5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites. Part 1: Noise.*

“Noise levels generated by site activities are deemed to be potentially significant if the total noise (pre-construction ambient plus site noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq,T}$ from site noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant effect.

These evaluative criteria are generally applicable to the following resources:

- *residential buildings;*
- *hotels and hostels;*
- *buildings in religious use;*
- *buildings in educational use;*
- *buildings in health and/or community use.*

For public open space, the impact might be deemed to cause significant effects if the total noise exceeds the ambient noise ($L_{Aeq,T}$) by 5 dB or more for a period of one month or more. However, the extent of the area impacted relative to the total available area also needs to be taken into account in determining whether the impact causes a significant effect.”

3.2 Operational Impacts

BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound⁶

- 3.2.1 BS 4142:2014+A1:2019 is used to rate and assess sound of an industrial and/or commercial nature including:
- Sound from industrial and manufacturing processes;
 - Sound from fixed installations which comprise mechanical and electrical plant and equipment;
 - Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
 - Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.
- 3.2.2 The purpose of the BS 4142:2014+A1:2019 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.
- 3.2.3 BS 4142:2014+A1:2019 refers to noise from the industrial source as the ‘specific noise’ and this is the term used in this report to refer to noise which is predicted to occur due to activities associated with the proposed commercial/industrial uses.
- 3.2.4 BS 4142:2014+A1:2019 assesses the significance of impacts by comparing the specific noise level to the background noise level (L_{A90}).
- 3.2.5 Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. BS 4142:2014+A1:2019 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS 4142:2014+A1:2019 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other

⁶BSI. BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

characteristics. The specific noise level along with any applicable correction is referred to as the 'rating level'.

3.2.6 The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS 4142:2014+A1:2019 are as follows:

- 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; and
- 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.

3.2.7 During the daytime, BS 4142:2014+A1:2019 requires that noise levels be assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.

3.2.8 Where the initial estimate of the impact needs to be modified due to context, BS 4142:2014+A1:2019 states that all pertinent factors should be taken into consideration, including:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or external acoustic conditions.

3.2.9 BS4142:2014+A1:2019 acknowledges context when considering the impacts of new noise sources. In this situation the proposed development will be situated in an area where there are existing businesses operating with the same use classes as is proposed for Arch 77. Nearby noise sensitive receptors will currently experience noise generated from the operations of these businesses which are similar in nature to the noise that would be generated from the proposed operations, thereby reducing their sensitivity to the new sources. This is reinforced by observations noted during the installation and collection of equipment. The main noise sources contributing to the background sound level were noted to be from roads and construction. The sources arising from the proposed development and change of use would be van movements similar in nature to these sources.

[World Health Organisation Guidelines for Community Noise⁷](#)

3.2.10 The World Health Organisation's Guidelines for Community Noise has been considered regarding the potential impact from any maximum short-term noise levels.

3.2.11 The WHO Guidelines indicate that sound pressure levels at the outside façades of living spaces should not exceed 60 dB L_{AFmax} so that people may sleep within bedrooms with windows open. These values assume the noise reduction with a window partially open is 15 dB, resulting in an internal noise level of 45 dB L_{AFmax} . The guidelines state that for good sleep, indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10 – 15 times per night. It is generally accepted that 60 dB L_{AFmax} at the façade represents a LOAEL.

⁷ World Health Organisation. 1999. *Guidelines for Community Noise*

3.3 Noise Modelling

3.3.1 The potential levels of noise at the existing noise sensitive receptors, as a result of the proposed development, have been predicted using the environmental noise modelling software CadnaA. Noise modelling methods and inputs that have been used are provided in [Table 3.2](#).

Table 3.2: Noise Modelling Inputs and Details

Noise Modelling Input	Details
Cadna Version	CadnaA 2023 MR1 Version
Calculation algorithm	ISO9613
Ground levels	OS Terrain 50
Noise sources	AAC library
Time periods	Daytime 07:00 – 23:00 Night-Time 23:00 – 07:00
Height of receptors	Ground floor 1.5m
Proposed site layout	Provided by The Arch Company Properties Limited
Existing buildings and receptor locations	Digitised from Google aerial imagery and OpenStreetMap data
Existing feature locations and base map	Google Aerial Imagery
Ground absorption	1 for soft ground, 0 for roads
Project co-ordinate system	OSGB 36 EPSG:27700

3.4 Assessment Receptors

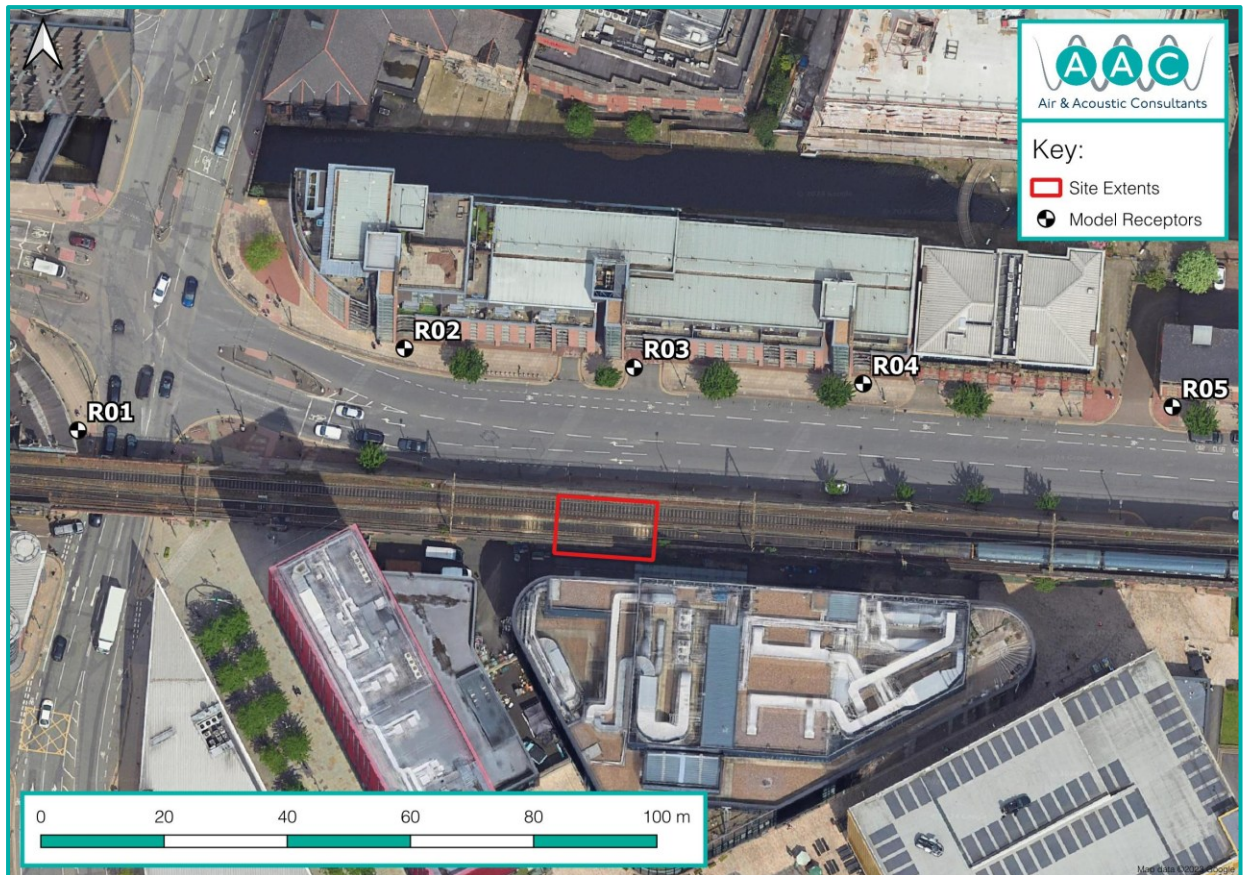
3.4.1 The receptors have been selected to represent the noise sensitive dwellings most exposed to the potential noise sources, as a result of the proposed development. The selected noise sensitive receptor locations are detailed in [Table 3.3](#) and illustrated in [Figure 3.1](#).

Table 3.3: Noise Sensitive Receptors

Receptor	Floor	Height (m)	Description	Receptor Location Description
R01	First	5.5	14 Albion St, Manchester M1 5NZ	Northeast Façade
R01	Second	8.5	The Hacienda, 11- 5DD, 15 Whitworth St W, Manchester	Northeast Façade
R02	Ground	2.5	The Hacienda, 11- 5DD, 15 Whitworth St W, Manchester	South Façade
R02	First	5.5	The Hacienda, 11- 5DD, 15 Whitworth St W, Manchester	South Façade
R02	Second	8.5	The Hacienda, 11- 5DD, 15 Whitworth St W, Manchester	South Façade
R03	Ground	2.5	11 Whitworth St W, Manchester M1 5DD	South Façade
R03	First	5.5	11 Whitworth St W, Manchester M1 5DD	South Façade
R03	Second	8.5	11 Whitworth St W, Manchester M1 5DD	South Façade
R04	Ground	2.5	Enterprise House, 15 Whitworth St W, Manchester M1 5WG	South Façade
R04	First	5.5	Enterprise House, 15 Whitworth St W, Manchester M1 5WG	South Façade

R04	Second	8.5	Enterprise House, 15 Whitworth St W, Manchester M1 5WG	South Façade
R05	First	5.5	25 Whitworth St W, Manchester M1 5ND	South Façade
R05	Second	8.5	25 Whitworth St W, Manchester M1 5ND	South Façade

Figure 3.1: Assessment Receptor Locations



3.4.2 Noise decreases with increasing distance from the source; therefore, any receptor that is located at a greater distance from the proposed development, than the identified receptors, will experience lower operational noise levels as a result of the development.

3.5 Uncertainty and Limitations

3.5.1 The calibration drift on the meters was very small; less than 0.1 dB for all measurements. All equipment was within laboratory calibration in accordance with the relevant standards (calibrators every year and sound level meters every 2 years).

3.5.2 Predictions have been made using the sound propagation software CadnaA, which is an industry standard and incorporates the required national standards for sound propagation. The propagation predictions have been made using the ISO 9613 algorithm as implemented by CadnaA. ISO 9613 states a variation of ± 3 dB for sources and receptors with height above ground of between 0 m and 5 m for separation distances of up to 1000 m, which is relevant to this assessment because all sources and many receptors are less than 5 m above the ground. The estimated error is for propagation with no reflections and no screening, the noise model contains buildings which reflect and screen the noise sources so the calculation error could be greater than ± 3 dB.

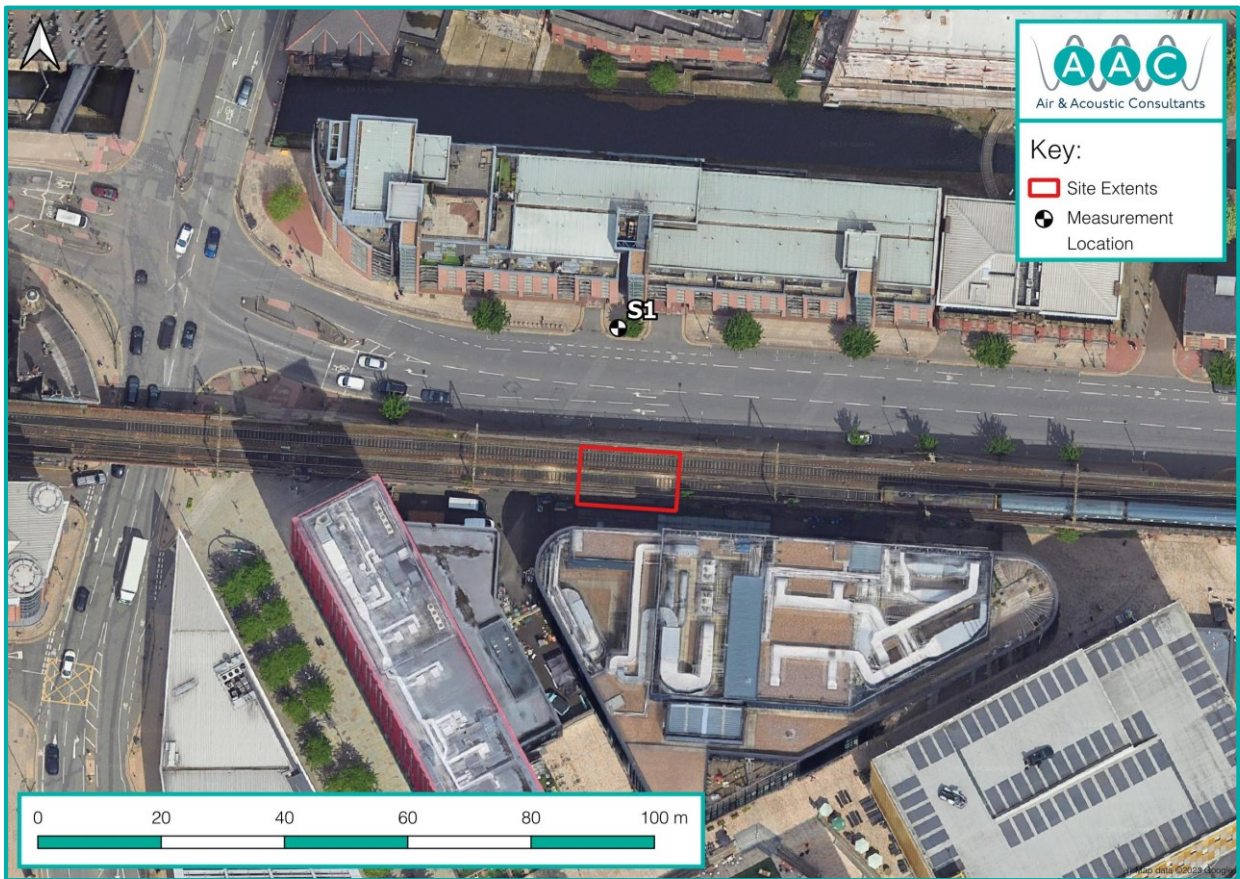
- 3.5.3 The locations of existing buildings and features have been digitised from aerial imagery, which is georeferenced to the WGS 84 system, so all features are the correct distance from each other and are at a consistent scale.
- 3.5.4 The source noise data that is used in the assessment has been taken from measurements undertaken by Air and Acoustic Consultants at similar types of industrial sites. Operations and equipment at different sites are likely to be different because of general differences in equipment and methods of operation are generally representative.
- 3.5.5 Penalties applied to the specific levels experienced by the noise sensitive receptors cannot be experienced prior to the site being occupied so penalties must be applied qualitatively based on the experience of the assessor. The penalties may include error in this case because the specific sound may be audible at the residential properties, but the penalties are worst-case to account for this.
- 3.5.6 The topography data for the surrounding areas is ordnance survey Terrain 50 which is a grid of height points with 50 metres spacing this means that small topography features such as bunds and embankments are not represented well. However, the surrounding topography is relatively flat with few of these types of topography changes.
- 3.5.7 In summary, it is considered that whilst there will always be a level of inherent uncertainty in any assessment, where possible, potential sources of uncertainty have been minimised, and it is considered to be a representative and robust assessment of the likely impacts.

4 Baseline Conditions

4.1 Noise Survey Details

- 4.1.1 A short-term attended baseline noise survey was undertaken between Thursday 17th September and Friday 18th September 2024. The survey consisted of 1 short-term measurement position at the location illustrated in [Figure 4.1](#) and detailed below:
- S1 – North of the application site adjacent to the Hacienda apartments, attended long-term.
- 4.1.2 The sound level meter captured background sound levels at a location which are representative of the closest noise sensitive residential properties on Whitworth Street.

Figure 4.1: Noise Measurement Location



- 4.1.3 The measurements were taken using a class 1 sound level meters. The microphone's measurement position was in the acoustic free field and was mounted on a tripod at 1.5 metres above the ground. Calibration checks were performed at the start and end of the survey; no significant drift in calibration was observed. The details of the measurement equipment used is set out in [Table 4.1](#), where the date when the calibration is due is 2 years after the date of the most recent calibration for sound level meters and 1 year for sound calibrators.

Table 4.1: Noise Measurement Equipment

Equipment Type	Manufacturer	Model	Serial Number	Calibration Due
Sound Level Meter	Larson Davis	Model 831	4740	11/2025
Pre-Amplifier		PRM831	71241	

Equipment Type	Manufacturer	Model	Serial Number	Calibration Due
Microphone		377BO2	334198	
Calibrator	Larson Davis	Cal 200	21371	08/2025

- 4.1.4 The weather conditions during the survey were influenced by low-speed winds with no rain. The average daily temperature stayed between 15 °C and 16 °C for the whole survey period.
- 4.1.5 A summary of the weather data is provided in [Table 4.2](#), which uses data from Weather Underground. The weather station is called Tariff Street (Station ID: IMANCH162).

Table 4.2: Summary of Weather Conditions

Date	Temp (°C)	Wind Speed (m/s)		Wind Direction	Total Precipitation (mm)
		Average	Peak		
17/10/2024	15.6	0.6	3.0	ENE	0.00
18/10/2024	15.2	1.0	3.8	ENE	0.00

- 4.1.6 Windy or rainy conditions may affect the measured sound levels, increasing them above what is normally created by the existing noise sources. During the attended noise survey, no adverse weather conditions were experienced to the level where data would be removed from calculations.

4.2 Attended Noise Survey Results

- 4.2.1 A summary of the measured sound levels at L1 is presented in [Table 4.3](#): Noise Measurement Results – L1, Attended Long-Term. The data is presented as average levels for the daytime and night-time periods calculated from 15-minute sound indices.

Table 4.3: Noise Measurement Results – L1, Attended Long-Term

Date	Period	Average Measured Sound Levels (dBA)		
		L _{Aeq}	L _{AFmax} **	L _{A90} **
17/10/2024 –	Day 12:25 - 13:25	66.6	86.0	58.1
18/10/2024	Night 00:30 - 01:30	63.4	77.1	52.8

4.3 Background Sound Levels

- 4.3.1 As part of an assessment of industrial or commercial sound and following the guidance of BS 4142:2014+A1:2019, a representative background sound level must be determined. Typically, the modal L_{A90,15min} value from the relevant time period is used.
- 4.3.2 The modal L_{A90,15min} has been identified for the measurement location using statistical analysis. These levels are considered to be the representative background sound levels for each period and are summarised in [Table 4.4](#).

Table 4.4: Background Sound Levels

Measurement Location	Background Sound Levels (dBA)	
	Daytime (07:00-23:00)	Night-Time (23:00-07:00)
S1	57	52

5 Construction Impact Assessment

- 5.1.1 At this stage of the scheme, details regarding the construction traffic movements and the type, number and size of construction equipment are not available. Therefore, it is not possible to predict, with any great degree of accuracy, the possible effects arising from construction activities associated with the consented development.
- 5.1.2 The development is limited to material alteration works and the full proposed material alterations are listed as follows:
- Replace existing front infill with new glazed infill (in line with LPA approved design at Corporation Street but with louvering to the rear);
 - Repairs to existing rear infill;
 - Replacement of mezzanine and staircase;
 - Installation of fire corridor;
 - Patch repair to floor slab;
 - Patch repair and spray paint existing lining;
 - Install LED lighting;
 - Allowance for works to existing water and gas supplies;
 - Allowance for works to drainage including installing pop up for WC; and;
 - Install three phase electricity supply.
- 5.1.3 On weekdays, typical construction working hours are anticipated to be 07:30 – 17:30, and potentially 07:00 – 18:30 in the summer months. On Saturdays, working hours are expected to be between 07:30 and 13:00 hours. Work on Sundays/Bank Holidays will only take place in exceptional circumstances. The construction work will be carried out under the Considerate Constructors Scheme, which, as one of its objectives, aims to reduce adverse noise impacts on nearby residents.
- 5.1.4 During the early stages of the construction phase, there would be a slight increase in HGV movements on the surrounding highway network. However, this will be a temporary impact and will decrease as the consented development progresses towards completion.
- 5.1.5 Overall, based on the experienced gained from similar sites, and on the existing ambient noise levels at the closest residential receptors, it is anticipated that although the main construction phases may be audible at times, they will result in no more than a minor adverse impact, only during the daytime. It should also be noted that this effect will only be temporary, whilst the construction phase(s) are moving forward.
- 5.1.6 Following the BS 5228-1:2009+A1:2014 ABC classification method, during the daytime working hours mentioned above, the nearby sensitive receptors would fall into Category A, with a threshold noise level criteria of 65 dB(A) during the daytime.

6 Operational Impact Assessment

6.1 Operational Commercial Sound

- 6.1.1 As described in [Section 3.1](#), the potential adverse effects of commercial and/or industrial sound experienced at the closest noise sensitive receptors have been assessed using the methodology in BS 4142:2014+A1:2019. The typical background sound levels for the daytime and night-time periods used in the assessment are given in [Table 4.4](#).
- 6.1.2 The proposed development includes the change of use to open E use class drinking establishment with expanded food provision (sui generis).
- 6.1.3 While the end users are not known at this point, the planning permission seeks approval for operations which could be 24-hours per day, 7 days per week and as such has been assessed during the daytime and the night-time.
- 6.1.4 The primary sources of operational sound likely to be produced have been identified as vehicle movements associated with the flexible use class E. Vehicle movements will be limited by the available parking outside the unit.
- 6.1.5 The source levels used for the predictions of industrial noise have been taken from the Air and Acoustic Consultants library of sound measurements. Details of the sources used in the assessment are provided in [Table 6.1](#).

Table 6.1: Sound Sources Used in the Commercial Noise Assessment

Activity	Sound Power Level (dB) at Octave Band Centre Frequencies (Hz)								Overall dB(A)
	63	125	250	500	1 k	2 k	4 k	8 k	
Van reversing	89.4	78.6	77	76.6	83.6	78.6	75.9	70.3	86.3

- 6.1.6 No external fixed plant or equipment is proposed to be installed as part of the proposal and so none has been considered within the assessment. Additionally, entertainment noise in the form of amplified or live music has not been considered. Provision for fixed plant or amplified music could be controlled by a requirement for a further submission should any plant or equipment installation be required.
- 6.1.7 Each sound source has had corrections added to account for the assessment period and activity duration in line with BS 4142:2014+A1:2019.
- 6.1.8 The on-time corrections for the operations are based upon the typical industrial operations observed by Air and Acoustic Consultants and a number of worst-case assumptions based on the proposed site layout.
- 6.1.9 The on-time corrections are made using the following equation:

$$10 \times \log \left(\frac{d \times 10^{\frac{L}{10}}}{D} \right)$$

- 6.1.10 Where d is the duration of the activity in minutes, L is the sound power level of the activity and D is the assessment duration in minutes, 1 hour during the daytime and 15 minutes during the night-time. The on-time corrected noise sources are provided in [Table 6.2](#).
- 6.1.11 No predictions of the number of vehicles that may service the site have been provided so worst-case assumptions have been made.

Arch 77 Whitworth Street, Manchester

Noise Assessment



- 6.1.12 The modelling and calculations allow for each noise source to represent 4 vans approaching and parking during the one-hour daytime assessment period and one movement during the 15-minute night-time assessment period to ensure a robust worst-case assessment. Each van movement is predicted to take 30 seconds which is considered worst case.
- 6.1.13 Each van will drive to near the entrances to the railway arches and likely park in the loading bays. Once they have manoeuvred, they will either load or unload by hand or using trolleys. The corrected sound power levels are provided below in [Table 6.2](#).

Table 6.2: Sound Source On-Time Calculations

Activity/Equipment Name	Source Sound Power Level L _{WA} (dBA)	Duration (min)		Corrected Sound Power Level L _{WA} (dBA)	
		Daytime	Night-Time	Daytime	Night-Time
Van reversing	86.3	2	0.5	71.5	71.5

- 6.1.14 The sound sources and their respective location within the noise propagation model for the operational noise assessment are shown in [Figure 6.1](#).

Figure 6.1: Modelled Sound Source Locations, BS 4142 Commercial Noise Assessment



- 6.1.15 The predicted specific sound levels at the noise sensitive receptors require a penalty to account for distinctive characteristics in line with the BS 4142:2014+A1:2019 method. Penalties account for distinctive characteristics that may make a sound more prominent than the existing noise environment. Penalties can be added for tonality, impulsivity, intermittency, or other characteristics not captured in the three defined classes. Details of all noise character penalties that have been applied to the assessment are set out in [Table 6.3](#).

Table 6.3: Rating Level Penalties

Receptor	Penalty (dB)	Rating Penalty Description
R01, R04 - R05	0	Impulsivity – 0 dB, Tonality – 0 dB, Intermittency – 0 dB The predicted specific sound levels are much lower than the existing background sound levels and therefore no distinctive characteristics are expected to be audible.
R02	0	Impulsivity – 0 dB, Tonality – 0 dB, Intermittency – 0 dB The noise rating levels are at a similar level to the background sound level however the dominant source of operational sound can be identified as vehicle movements on the site and are not expected to be different in character compared to existing road traffic noise from Whitworth Street. Therefore, no penalty has been applied.

6.1.16 The predicted noise rating levels at the noise sensitive receptors are presented in [Table 6.4](#) along with a comparison with the representative background sound levels as defined in BS 4142:2014+A1:2019.

Table 6.4: Predicted Commercial Noise Impacts at Sensitive Receptors

Receptor	Daytime (07:00 – 23:00) (dBA)			Night-Time (23:00 – 07:00) (dBA)		
	Rating Level $L_{Ar, Tr}$	Background Level	Difference	Rating Level $L_{Ar, Tr}$	Background Level	Difference
R01 1F	32	50	-18	32	42	-10
R01 2F	31	50	-19	31	42	-11
R02 GF	43	50	-7	43	42	1
R02 1F	43	50	-7	43	42	1
R02 2F	42	50	-8	42	42	0
R03 GF	40	50	-10	40	42	-2
R03 1F	40	50	-10	40	42	-2
R03 2F	39	50	-11	39	42	-3
R04 GF	34	50	-16	34	42	-8
R04 1F	34	50	-16	34	42	-8
R04 2F	34	50	-16	34	42	-8

6.1.17 It can be seen in [Table 6.4](#), that all of the daytime and night time predicted noise rating levels, at all receptors, are below the BS 4142:2014+A1:2019 criterion of less than 5 dB(A) above the background sound level. Further to this all of the daytime and most of the night-time noise rating levels are below the existing background sound level. Only 1 of the receptors (R02) is predicted to, under a reasonable worst case to exceed the background sound level by up to 1 dB(A).

6.1.18 The assessment methodology includes a consideration of the site-specific context and the existing noise environment that affects the residential properties includes significant rail noise, road traffic and noise from the other commercial and industrial operations within the area. This other background noise will disguise the proposed noise sources, and it is not likely that the development noise will be audible in the context of the wider noise sources, especially the road traffic noise. It should also be noted that the existing noise will mean that the residents of nearby properties will also be less sensitive to the new proposed noise sources which will have a similar character to existing noise sources.

- 6.1.19 The neighbouring arches are currently made up of businesses that operate under a mixture of B2 and mixed-use class E. The nearby residential receptors will be accustomed to the typical sources of noise, associated with these types of uses and this reduces their sensitivity.
- 6.1.20 On balance the context reinforces the position that the development is not likely to result in any adverse impacts, and the impacts are likely to be classified as NOAEL to LOAEL for all receptors and specific mitigation will not be required or beneficial (due to the existing noise levels).
- 6.1.21 Predicted industrial noise contours are presented in [Appendix B](#) showing how sound is likely to propagate from the sources to the noise sensitive receptors.

6.2 Operational Commercial Maximum Sound Levels

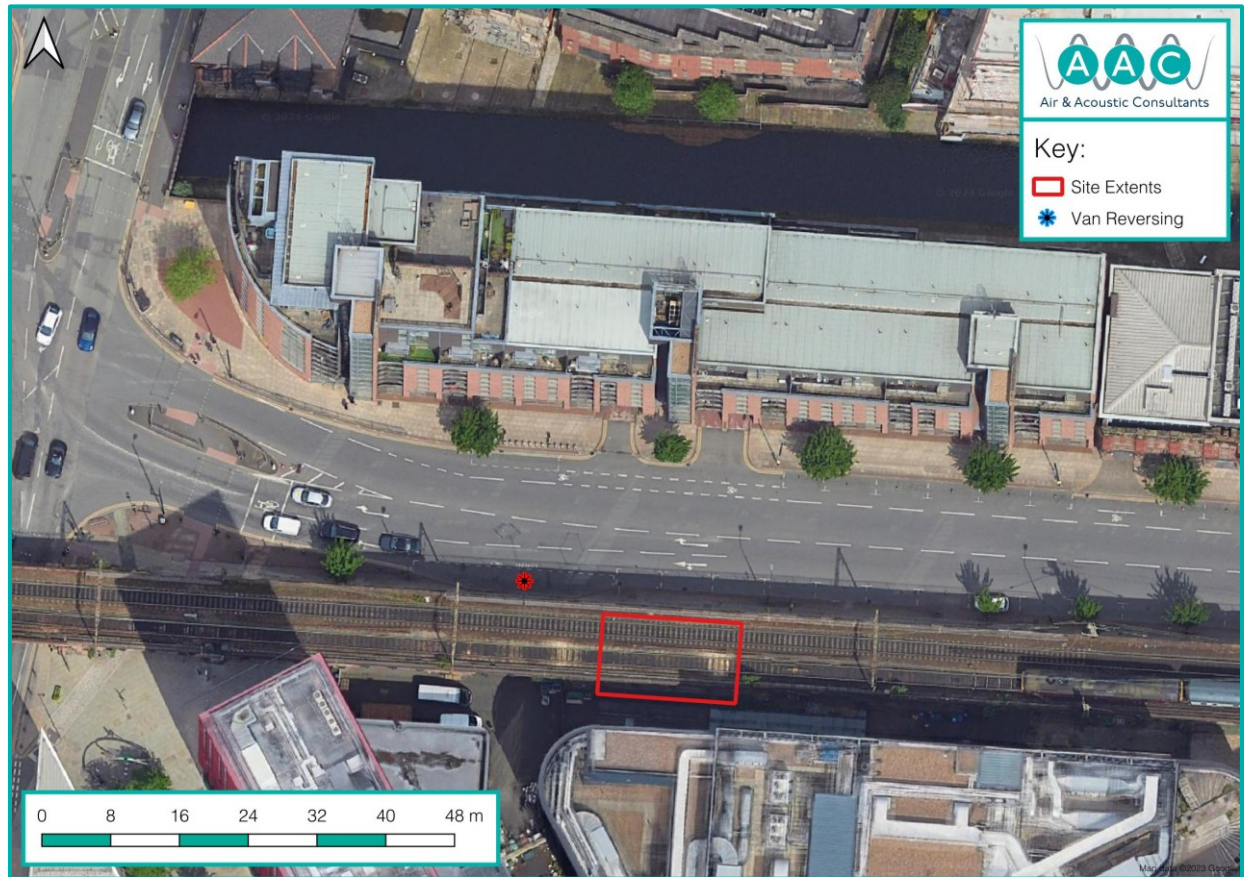
- 6.2.1 The WHO Guidelines state that to avoid night-time sleep disturbance indoor sound pressure levels should not exceed approximately 45 dB(A) L_{AFmax} more than 10 – 15 times per night. It is generally accepted that 60 dB(A) L_{AFmax} at the external façades of living spaces corresponds to the LOAEL. These values assume the sound reduction provided by a partially open window is 15 dB, resulting in an internal noise level of 45 dB(A) L_{AFmax} .
- 6.2.2 All maximum events have been modelled as point sources at worst-case locations, the number of sources is fewer than in the BS 4142:2014+A1:2019 industrial noise assessment because maximum noise events are extremely unlikely to be simultaneous.
- 6.2.3 The source levels used in the assessment, has been taken from the Air and Acoustic Consultants library of sound measurements, details of the sources used in the assessment are provided in [Table 6.5](#).

Table 6.5: Sound Sources Used in the Maximum Noise Assessment

Activity	Sound Power Level (dB) at Octave Band Centre Frequencies (Hz)								Overall dB(A)
	63	125	250	500	1 k	2 k	4 k	8 k	
Van Reversing	83.6	73.0	70.0	72.9	79.1	72.3	70.5	63.9	80.6

- 6.2.4 The sound sources included in the noise propagation model for the maximum operational noise assessment are shown in [Figure 6.2](#).

Figure 6.2: Modelled Sound Source Locations, Maximum Noise Assessment



6.2.5 The predicted levels at the receptors from maximum noise events are provided in [Table 6.6](#) along with a comparison to the WHO maximum sound level criterion.

Table 6.6: Predicted Maximum Commercial Noise Impacts at Sensitive Receptors

Receptor	Night-Time (23:00 – 07:00) (dBA)		
	Predicted Level	Criterion Level	Difference
R01 1F	37.5	60.0	-22.5
R01 2F	37.5	60.0	-22.5
R02 GF	48.9	60.0	-11.1
R02 1F	48.8	60.0	-11.2
R03 1F	48.2	60.0	-11.8
R03 2F	45.9	60.0	-14.1
R03 3F	45.9	60.0	-14.1
R04 1F	45.2	60.0	-14.8
R04 2F	40.0	60.0	-20.0
R05 1F	40.0	60.0	-20.0
R05 2F	40.1	60.0	-19.9

6.2.6 The maximum noise event levels from the commercial operations are lower than the 60 dB(A) WHO criterion at all of the identified noise sensitive receptors. In accordance with national policy the impacts would be categorised as less than LOAEL and mitigation will not be required.

- 6.2.7 Predicted night-time maximum noise contours are presented in [Appendix B](#) showing how sound is likely to propagate from the sources to the noise sensitive receptors.

6.3 Entertainment Sound Levels

- 6.3.1 Entertainment sound level data has been taken from the AAC database in and is considered to be representative of a similar type of venue, where speech is the dominant source of noise, but there may also be background music noise provided by speakers.
- 6.3.2 The Good Practice Guide for Noise from Pubs and Clubs provides criteria for entertainment noise depending on the frequency of events. While there is no indication that there might be planned events involving music the assessment is focussed on typical noise from the use of the premises which would be likely to occur multiple times per week, therefore the most onerous criteria have been used.
- 6.3.3 There are 2 separate criteria that consider broadband sound levels and low frequency sound; if the criteria are met it is stated that the entertainment noise is likely to be virtually inaudible at the noise sensitive property. The first part of the criterion states that the entertainment noise L_{Aeq} should not exceed the background sound level in the absence of entertainment noise and the second part of the criteria is that the L_{10} should not exceed the background L_{90} in any 1/3rd octave band between 40 Hz and 160 Hz. The low frequency assessment is not necessary for noise that is only related to speech because voices do not include significant low frequency components.
- 6.3.4 The calculated difference between the entertainment noise levels predicted at the residential properties and the background sound levels are presented in [Table 6.7](#), for the broadband values. It is assumed that the dominant source of noise is internal sound levels breaking out through the customer entrance with the doors open.

Table 6.7: Difference Between Entertainment L_{Aeq} and Background L_{A90}

Receptor	Daytime (07:00 – 23:00) (dBA)			Night-Time (23:00 – 07:00) (dBA)		
	Rating Level $L_{Ar, Tr}$	Background Level	Difference	Rating Level $L_{Ar, Tr}$	Background Level	Difference
R01 1F	33	57	-24	33	52	-19
R01 2F	32	57	-25	32	52	-20
R02 GF	44	57	-13	44	52	-8
R02 1F	44	57	-13	44	52	-8
R02 2F	43	57	-14	43	52	-9
R03 GF	46	57	-11	46	52	-6
R03 1F	46	57	-11	46	52	-6
R03 2F	46	57	-11	46	52	-6
R04 GF	41	57	-16	41	52	-11
R04 1F	41	57	-16	41	52	-11
R04 2F	41	57	-16	41	52	-11

- 6.3.5 The predicted results show that entertainment noise levels do not exceed the background sound levels at any of the receptors. The highest predicted sound level is at R03, which is the closest receptor.
- 6.3.6 The predicted levels show no exceedances of the existing background sound levels by the entertainment noise levels at any receptor. This suggests that the typical operations of the venue will not be audible for the nearby receptors and is therefore unlikely to have any adverse noise impacts.

7 Mitigation Measures

7.1 Operational Commercial Noise Levels

- 7.1.1 The assessment has demonstrated that no adverse impacts are anticipated as a result of the proposed development.
- 7.1.2 Additionally, the predicted maximum sound levels at all receptor locations are within the WHO criterion of no higher than 60dB(A).
- 7.1.3 Based upon the existing noise levels measured at the site, the addition of specific mitigation measure would not reduce the existing level of noise at any of the existing noise sensitive receptors and so no additional mitigation is proposed as part of the development.

8 Summary & Conclusions

8.1 Background

- 8.1.1 Air & Acoustic Consultants Limited have been commissioned by The Arch Company Properties Limited to undertake a noise impact assessment in support of a planning application at the site known as Arch 77 Whitworth Street.
- 8.1.2 The property is anticipated to attract demand from a range of Class E uses especially, retail and F&B operators and therefore planning consent is required for the change of use to open E uses and material alterations to the frontage.
- 8.1.3 A short-term attended baseline noise survey was undertaken over 2 days in October 2024 to characterise the existing noise environment and help assess the potential impacts of the proposed development upon the nearby noise-sensitive receptors.

8.2 Operational Phase

- 8.2.1 The operational noise levels associated with the proposed development have been assessed using a combination of noise monitoring data and predictive noise modelling of the potential operational noise sources, using a CadnaA sound propagation model. Both the monitoring and modelling assessment have been undertaken in line with the relevant British Standards, Guidance documents and Policy.
- 8.2.2 The predicted noise rating levels at all of the noise sensitive receptors are less than the assessment criterion level of no more than 5 dB above the background sound level. The predicted day time and night-time noise rating levels are less than the background noise level at all but one of the identified noise sensitive receptor locations.
- 8.2.3 The rating level at the first-floor level of receptor R02 is predicted, under a worst-case conditions to be up to 1 dB(A) above the existing background sound level.
- 8.2.4 Taking into account the result of the assessment and the wider context of the area, it is unlikely that the residential properties will experience any adverse noise impacts associated with the operational use of the units.
- 8.2.5 Additionally, predicted maximum sound levels are less than the WHO criterion at all of the noise sensitive receptor locations.
- 8.2.6 It can, therefore, be concluded that the impacts associated with the proposed development have been consider in line with the relevant standards and guidance and it is unlikely to conflict with the national, regional, and local planning policies. Based upon the outcome of the assessment the impacts can be classified as between NOEL and LOAEL.
- 8.2.7 This application does not include in provision or installation of any plant or equipment associated with the end use of the units and should the end user require any plant or equipment this would be subject of a separate submission.

Appendices

APPENDIX A – DEFINITION OF TERMS

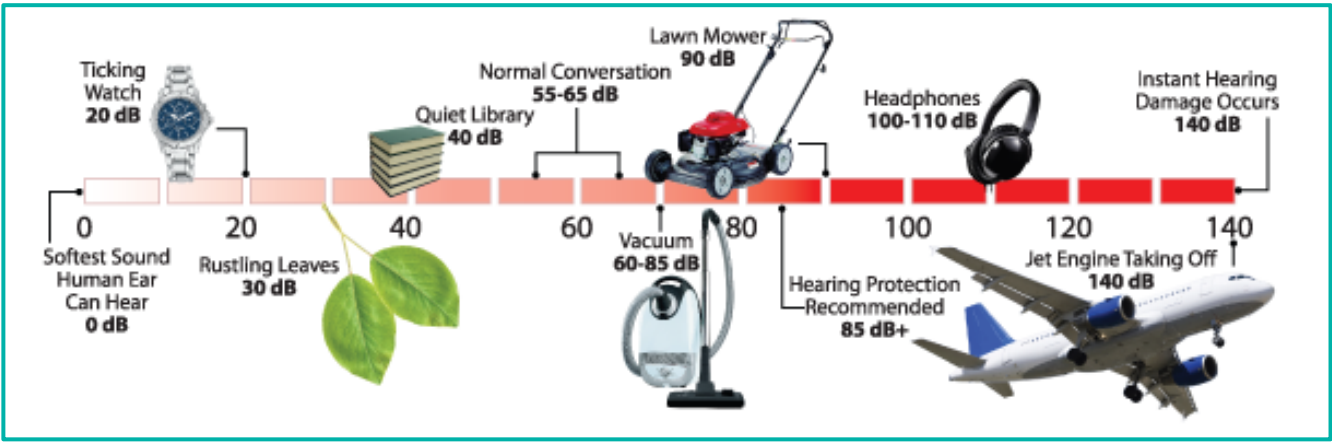
Sound Pressure - Sound, or sound pressure, is a fluctuation in air pressure over static ambient pressure.

Sound Pressure Level - The sound level is the sound pressure relative to a standard reference pressure of 20 μPa (2×10^{-5} Pascals) on a decibel scale.

Decibels dB - Noise is commonly defined as unwanted sound. The range of audible sound is from 0 dB to 140 dB, which is taken to be the threshold of pain. The sound pressure detected by the human ear covers an extremely wide range. The decibel (dB) is used to condense this range into a manageable scale by taking the logarithm of the ratio of the sound pressure and a reference sound pressure.

The decibel scale is logarithmic and therefore when two noise sources are present together, they must be combined logarithmically, therefore, when two sound sources of the same sound pressure level are combined the resultant level is 3 dB(A) higher than the single source. However, in subjective terms, the ear can distinguish a difference in 'loudness' between two simple noise sources when there is a 3 dB(A) difference between them. For simple sources, when two sounds differ by 10 dB(A) one is said to be twice as loud as the other.

Figure A.1: Examples of Typical Noise Levels



Noise Level Indices - Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so several different noise indices have been defined, according to how the averaging or statistics are carried out.

'A-Weighted Decibels dB(A) - The frequency response of the ear is usually taken to be about 18Hz (number of oscillations per second) to 18,000Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than at the lower and higher frequencies, and because of this, the low and high-frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise-measuring instrument. The weighting which is most used, and which correlates best with the subjective response to noise, including that of music, is the dB(A) weighting. This electronic filter matches the variation in the frequency sensitivity of the meter to that of the human ear. This is an internationally accepted standard for noise measurements.

Table A.1: Other Standard Noise Units:

Symbol	Name	Definition
$L_{Aeq,T}$	Equivalent Continuous Sound Level	The A-weighted sound pressure level of a steady sound that has, over a given period, the same energy as the fluctuating sound under investigation. The L_{Aeq} provides a single value to express the average sound energy over the measurement period and is the most widely used indicator for environmental noise.
$L_{Amax,T}$	maximum 'A' weighted noise level	This is the maximum 'A' weighted noise level recorded during the measurement period, (T).
$L_{A90,T}$	the 'A' weighted noise level	This is the 'A' weighted noise level exceeded for 90% of the measurement period (T). This is normally used to describe the background noise.

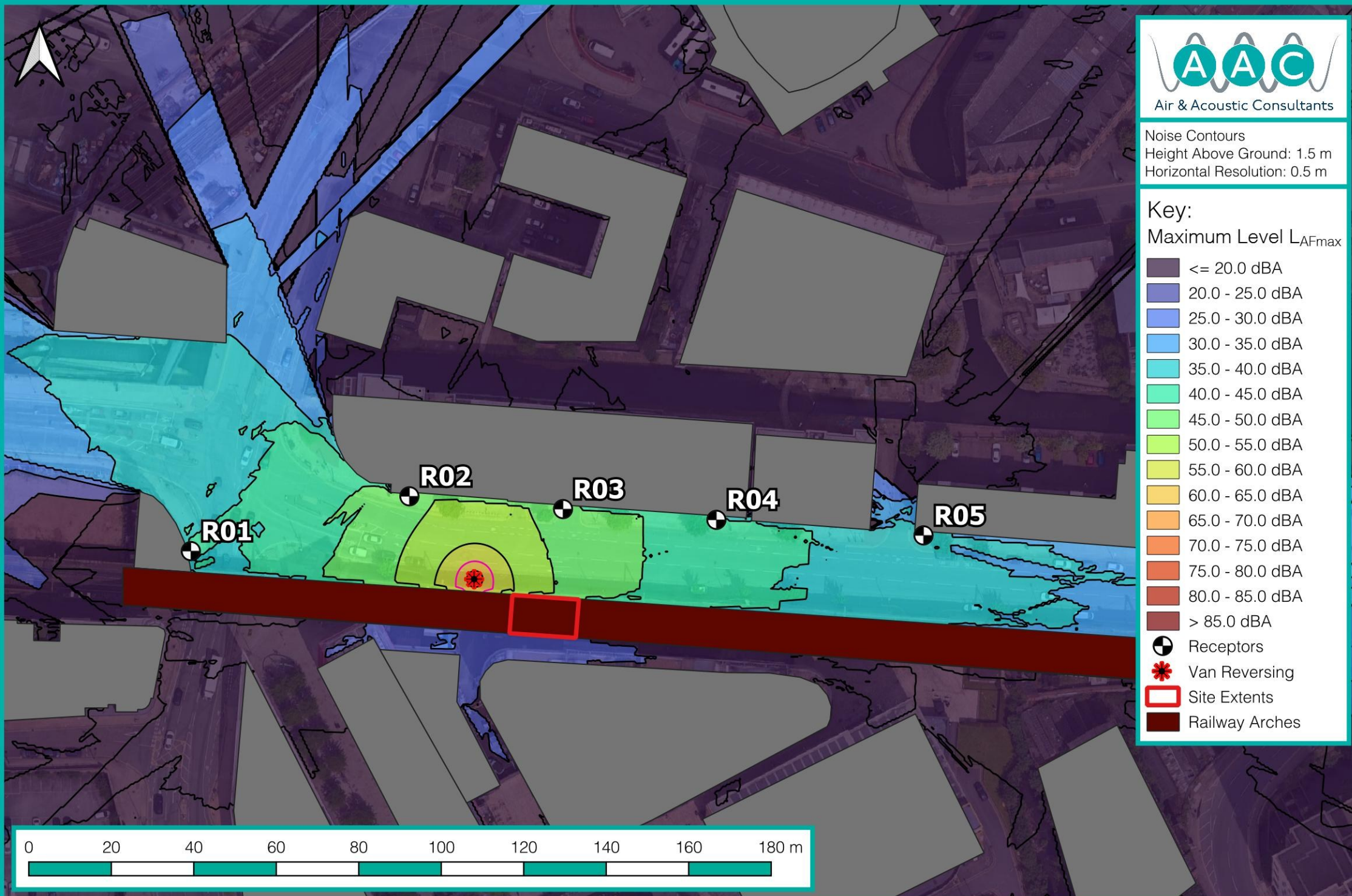
Symbol	Name	Definition
$L_{A10,T}$	the A-weighted noise level exceeded for 10% of time	This is the 'A' weighted noise level exceeded for just 10 % of the measurement period, (T). This is normally used to describe traffic noise.
$L_{A90,T}$	the A-weighted noise level exceeded for 90% of the time	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} , can be considered to be the "average minimum" noise level and is often used to describe the background noise.
L_S	Specific noise level.	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval.
$L_{Ar,Tr}$	Rating noise level	The specific noise level plus any adjustments for characteristic features of the noise.
$D_{n,c,w}$	Laboratory Insulation Rating	A single-number rating of the laboratory measurement of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it.
$D_{nf,w}$	Weighted normalised flanking level difference	A single-number that quantifies the in-situ airborne sound insulation between rooms, when the transmission only occurs through a specified flanking path.
$D_{nT,w}$	Weighted standardized level difference	Single-number quantity that characterizes the in-situ airborne sound insulation between rooms.
R_w	Weighted sound reduction index.	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies in a laboratory.
C_{tr}	Low-Frequency Correction	Correction term applied against the sound insulation single-number values (R_w , D_w and $D_{nT,w}$) to provide a weighting against low-frequency performance.
NOEL	No Observed Effect Level	Noise Policy Statement for England (2010) - The noise 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.
LOAEL	Lowest Observed Adverse Effect Level	Noise Policy Statement for England (2010) - The noise level above which adverse effects on health and quality of life can be detected.
SOAEL	Significant Observed Adverse Effect	Noise Policy Statement for England (2010) - The noise level above which significant adverse effects on health and quality of life occur.

APPENDIX B – NOISE CONTOURS

B.1 Specific Level Noise Contours



B.2 Maximum Level Noise Contours





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