

ENVIRONMENT

Wilson Bowden Developments Ltd &
Rochdale Borough Council
Plot R2 Atom Valley Innovation Centre (AVIC)
Rochdale

Noise Assessment

ENVIRONMENT

Wilson Bowden Developments Ltd &
Rochdale Borough Council
Plot R2 Atom Valley Innovation Centre (AVIC)
Rochdale
Noise Assessment

Birmingham
Livery Place, 35 Livery Street, Colmore Business District
Birmingham, B3 2PB
T: 0121 233 3322

Leeds
Whitehall Waterfront, 2 Riverside Way
Leeds, LS1 4EH
T: 0113 233 8000

London
11 Borough High Street
London, SE1 9SE
T: 0207 407 3879

Manchester
11 Portland Street
Manchester, M1 3HU
T: 0161 233 4260

Nottingham
5th Floor, Waterfront House, Station Street
Nottingham, NG2 3DQ
T: 0115 924 1100

May 2024

DOCUMENT ISSUE RECORD

Document Number:	PLK-BWB-ZZ-ZZ-RP-YA-0001_NIA_S2_P05
BWB Reference:	232081-NIA-005

Revision	Date of Issue	Status	Author:	Checked:	Approved:
P01	18/08/2023	S2	Michaela Moffatt BSc (Hons) MSc MIOA	Luke Smith BEng (Hons), MIOA	Mike Barrett BSc (Hons), PGDip, MIOA
P02	24/08/2023	S2	Michaela Moffatt BSc (Hons) MSc MIOA	Luke Smith BEng (Hons), MIOA	Mike Barrett BSc (Hons), PGDip, MIOA
P03	26/04/2024	S2	Michaela Moffatt BSc (Hons) MSc MIOA	Luke Smith BEng (Hons), MIOA	Mike Barrett BSc (Hons), PGDip, MIOA
P04	01/05/2024	S2	Michaela Moffatt BSc (Hons) MSc MIOA	Luke Smith BEng (Hons), MIOA	Mike Barrett BSc (Hons), PGDip, MIOA
P05	09/05/2024	S2	Michaela Moffatt BSc (Hons) MSc MIOA	Luke Smith BEng (Hons), MIOA	Mike Barrett BSc (Hons), PGDip, MIOA

Notice

This document has been prepared for the sole use of the Client in accordance with the terms of the appointment under which it was produced. BWB Consulting Limited accepts no responsibility for any use of or reliance on the contents of this document by any third party. No part of this document shall be copied or reproduced in any form without the prior written permission of BWB.

EXECUTIVE SUMMARY

This Noise Assessment has been undertaken on behalf of Wilson Bowden Developments Ltd & Rochdale Borough Council for the erection of a research & development building (Use Class E) including office, laboratory & production space, function space & café, new access, car parking, servicing, boundary treatments, hard and soft landscaping and other associated works off land at Plot R2 AVIC Kingsway Business Park, Rochdale.

The results of the noise impact assessment indicate that the effects of operational noise on to the nearest noise sensitive receptors to the proposed development would achieve the limits in Condition 23.

Appropriate noise level limits have been set for fixed plant items in accordance with BS 4142:2014, to ensure that noise from fixed plant and equipment has a low impact at nearby residential receptors.

The assessment of the potential noise impact from car park usage indicates that at the worst affected receptors, there is not likely to be a significant effect from this noise.

The assessment also considers development generated road traffic noise on the surrounding road network in accordance with the general principles from DMRB and predicts a negligible impact.

Based on the results of the assessment, it has been demonstrated that the Site is suitable for proposed development. It is therefore considered that noise need not be a determining factor in the granting of full planning approval for the Site.

CONTENTS

EXECUTIVE SUMMARY iii

1. INTRODUCTION..... 1

 Background..... 1

 Site Setting 1

 Noise-Sensitive Receptors..... 2

 Existing Planning Permission 4

 Proposed Development 5

2. STANDARDS AND GUIDANCE 7

 National Planning Policy Framework (NPPF) 7

 BS 4142: 2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound 7

 BS 8233:2014: Guidance on Sound Insulation and Noise Reduction for Buildings 8

 World Health Organisation (WHO) 1999: Guidelines for Community Noise 9

 The Design Manual for Roads and Bridges (DMRB): LA111 Noise and Vibration (Revision 2) 9

 Consultation with Rochdale Borough Council 10

3. Assessment 11

 Noise Model 11

 Noise from Fixed Plant..... 16

 Noise from the Car Park..... 17

 Noise from the Function Space 18

 Development Generated Road Traffic 18

4. CONCLUSION 20

FIGURES

- Figure 1.1: Location Plan
- Figure 1.2 Noise Sensitive Receptor Locations
- Figure 1.3: Proposed Site Plan
- Figure 3.1: Daytime Noise Contours of Specific Noise Levels – Calculation at 1.5m Above Ground
- Figure 3.2: Night-time Noise Contours of Specific Noise Levels – Calculation at 4m Above Ground

TABLES

- Table 1.1: Existing Noise Sensitive Receptors
- Table 2.1: Summary of Internal Ambient Noise Levels to be achieved in Habitable Rooms when Assessed in Accordance with BS 8233

Table 2.2: Classification of Magnitude of Noise Impacts in the Short Term
Table 3.1: Summary of Historic HGV pass-by Noise Data used in Assessment
Table 3.2: Calculation of Noise Level from the Access Road
Table 3.3: Calculated Sound Pressure Level at 10m – Level Access Door
Table 3.4: Predicted Specific Sound Level at NSRs, Ls dB
Table 3.5: BS 4142 Assessment of Impact
Table 3.6: Opening Year road traffic BNLs, daytime 18-hour, dB(A)

APPENDICES

APPENDIX A: Glossary of Terms
APPENDIX B: Planning Condition 23

1. INTRODUCTION

Background

- 1.1 This Noise Assessment has been undertaken on behalf of Wilson Bowden Developments Ltd & Rochdale Borough Council for the erection of a research & development building (Use Class E) including office, laboratory & production space, function space & café, new access, car parking, servicing, boundary treatments, hard and soft landscaping and other associated works at Plot R2 AVIC Kingsway Business Park, Rochdale. The wider Plot R2 AVIC Kingsway Business Park is subject to outline planning permission (planning reference: 14/00542/OUT).
- 1.2 A self-contained full planning permission is sought for the Site. However, for the purposes of this assessment, noise related conditions associated with the outline permission for the Site have been considered. This has been undertaken based on the previous limits and guidance contained within relevant British Standards relating to noise.
- 1.3 Where appropriate, consideration has been given to noise mitigation measures to demonstrate how an appropriate level of protection could be afforded to future noise sensitive receptors on the Site.
- 1.4 This report is necessarily technical in nature, so to assist the reader, a glossary of acoustic terminology can be found in **Appendix A**.

Site Setting

- 1.5 The Site is located off Michael Faraday Avenue in Rochdale and comprises Plot R2 Atom Valley Innovation Centre (AVIC) of the wider Kingsway Business Park. The Site currently comprises scrub and grassland. To the north, the Site is bound by a Metrolink tramline, with residential properties beyond. Land to the east, south and west are as yet undeveloped plots of the wider business park. The south of the Site is bound by Michael Faraday Avenue.
- 1.6 The location of the Site is shown in **Figure 1.1**.

Figure 1.1: Location Plan



Noise-Sensitive Receptors

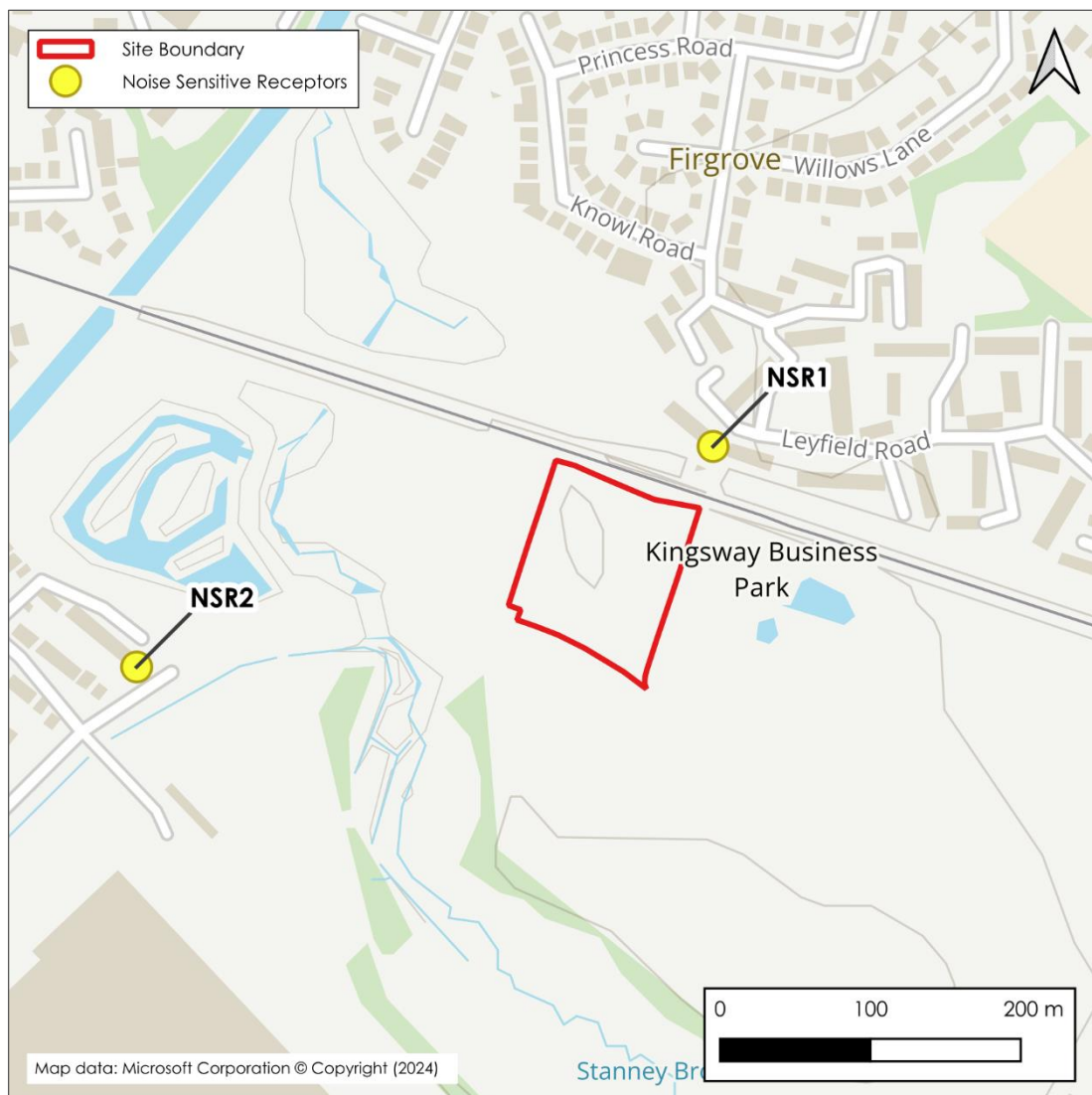
- 1.7 Noise from any proposed sources will be assessed at nearby existing noise sensitive receptors (NSRs). The nearest existing NSR is located to the north-east, off Turbary Walk, and is detailed below in **Table 1.1** and shown in **Figure 1.2**.

Table 1.1: Existing Noise Sensitive Receptors

NSR Number	Description	Grid Reference		Bearing from Site	Distance from Site Boundary
		Easting	Northing		
1	Residential dwellings off Turbary Walk	391916	412770	North-east	50m
2	Residential dwellings on Jones Way	391532	412623	South-west	205m

- 1.8 Noise generated within the Site may be experienced at other receptors; however, given the greater distance to these, any impact is likely to be less than at those stated above.

Figure 1.2 Noise Sensitive Receptor Locations



Existing Planning Permission

- 1.9 The R2 AVIC site already has outline planning permission for development (application ref: 14/00542/OUT). This permission allows for development across the Site in accordance with approved parameter plan (drawing ref: 2013-233/102revA) and is subject to several conditions. Condition 23 of planning permission 14/00542/OUT relates to noise emissions and states:

“23). Noise emitted from any building within the Site or from anything attached to any building or from plant and machinery used in connection with any building shall not exceed:

a) 58dB(A) L_{eq} (15 min.) between 0700 hours and 2300 hours and 48 dB(A) L_{eq} (5 min.) at any other time as measured at the facade of any noise sensitive property (or 55dB(A) L_{eq} (15 min.) and 45 dB(A) L_{eq} (5min.) as free field measurements within the curtilage of any noise sensitive building) outside the boundaries of the Site and to the south of the line A-A (or its linear projection) shown on

the Council's plan titled “Noise Control Plan”- condition 23, or within the boundary of the Site and to the south of the line A-A.

b) 52 dB(A) L_{eq} (15 min) between the hours of 0700 and 2300 and 48 dB(A) L_{eq} (5 min) at any other time as measured at the façade of any noise sensitive property, (or 49 dB(A) L_{eq} (15 min) and 45 dB(A) L_{eq} (5 min) as free field measurements within the curtilage of any noise sensitive building) outside the boundaries of the Site and to the north of the line A-A(or its linear projection) and to the south of the line B-B (or its linear projection) shown on the Council's plan titled “Noise Control Plan”- condition 23, or within the boundary of the Site, and to the north of the line A-A and to the south of the line B-B.

c) 51 dB(A) L_{eq} (15 min) between the hours of 0700 and 2300 and 45 dB(A) L_{eq} (5 min) at any other time as measured at the façade of any noise sensitive property (or 48 dB(A) L_{eq} (15 min) and 42 dB(A) L_{eq} (5min) as free field measurements within the curtilage of any noise sensitive building) outside the boundaries of the Site, and to the north of line B-B (or its linear projection) and to the south of line C-C (or its linear projection) shown on the Council's plan titled “Noise Control Plan”- condition 23, or within the boundary of the Site and to the north of the line B-B and to the south of the line C-C.

d) 48 dB(A) L_{eq} (15 min) between the hours of 0700 and 2300 and 43 dB(A) L_{eq} (5 min) at any other time as measured at the façade of any noise sensitive property (or 45 dB(A) L_{eq} (15 min) and 40 dB(A) L_{eq} (5 min) as free field measurements within the curtilage of any noise sensitive building) outside the boundaries of the Site and to the north of the line C-C (or its linear projection) shown on Council's plan titled “Noise Control Plan”- condition 23, or within the boundary of the Site and to the north of the line C-C.

For the purposes of this condition, line A-A is from the rear of 13 Verdant Way to the rear of 66A Ashfield Lane, line B-B is from Turf Hill Community Centre to the point where the path to the rear of 67 Beechfield Road crosses the boundary of the

Site and line C-C is from the junction of Stiups Lane with Turf Hill Road to the junction of Knowl Road with Princess Road.

A noise sensitive property is defined as any occupied residential unit or similar property or school classroom, except insofar as the element of the condition which relates to the curtilage of the noise sensitive building shall not include any curtilage of any classroom.

Reason: In the interests of the amenity of the area, and in particular that of the nearest neighbouring residents and to prevent nuisance in accordance with policies EC/7-Kingsway Business Park and EM/3-Noise and New Development, of the Council's adopted Unitary Development Plan."

- 1.10 In summary, Condition 23 requires that 'noise emitted from any building within the Site or anything attached to any building or from plant and machinery used in connection with any building' shall not exceed prescribed noise limits, which vary depending on the location.
- 1.11 The stated noise limits and location zoning are shown in **Appendix B**. It should be noted that "South of BB & north of AA" is incorrectly labelled as "South off CC & north of BB", in the published plan.

Proposed Development

- 1.12 The proposed development comprises the erection of a research & development building (Use Class E) including office, laboratory & production space, function space & café, new access, car parking, servicing, boundary treatments, hard and soft landscaping and other associated works for use by Atom Valley Innovation Centre (AVIC).
- 1.13 The proposed Site plan is detailed in **Figure 1.3**.

AVIC Red Line Application Boundary = 1.50 hectares / 3.71 Acres

AVIC Building

Total GIA (2 Storey) 3,913 m²
Total NIA 2,709 m²

Parking Schedule

86 Total Car Parking Bays (1 per 32m² NIA)
Includes:
~ 7 Accessible bays (= 8%)
~ 16 EVCP bays (= 20%)

Sheltered Cycle Parking = 10 Spaces (5 Sheffield type stands)

Motor Cycle Parking = 4 Spaces

Soft landscape and tree arrangement shown indicatively
Refer to DLA drawing AVIC-DLA-XC-00-DR-A99100 for details

Site Plan Details:

- Secure Fencing to yard
- Secure Fencing to road
- Gate
- Asphalt Access Road
- Concrete Service Yard
- Workshop
- Level Access
- Gate
- Gate
- 8 No EVCP
- 16 No EVCP
- 86 Parking Spaces (Sheltered / Covered Stands and 16 EVCP Stands)
- 10 Shelter
- 7 Accessible Bays
- Motor Cycle
- AVIC Building FTS 148.50
- Main Entrance
- Underdeveloped Plot 81
- New Retaining Structure to Sub Station
- New Substation with Parking
- Michael Faraday Avenue
- New Fire Hydrant
- New Pedestrian Crossing Entrance
- Existing Pedestrian Crossing shaded brown to be stopped and removed and foot / cycleway to be made good
- New pedestrian footpath
- Existing Asphalt path to Metrolink Train Stop cross hatched red to be closed and diverted
- New Diverted Asphalt path to Metrolink Train Stop shaded green
- Underdeveloped Plot 71
- Island For Future Rising Arm Barrier Access Controls
- New Pedestrian Crossing shaded yellow to LPA Highway approval
- Metrolink Train Stop
- Turbary Walk

Page | 6

2. STANDARDS AND GUIDANCE

National Planning Policy Framework (NPPF)

- 2.1 Published in December 2023, this document sets out the Government's planning policies for England and supersedes the previous NPPF published in 2021. It makes the following reference to noise in the section entitled Conserving and enhancing the natural environment:

"180. 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 It also makes the following references to noise in the Section entitled Ground conditions and pollution:

"191. 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 life⁶⁹;

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.

⁶⁹ See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."

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

- 2.3 The BS 4142 Standard describes methods for rating and assessing the following:

- 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 movements on or around an industrial and/or commercial site.

2.4 The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. The Standard advises the purpose of the methodology includes the assessment of sound from any plant and activities associated with existing industrial and/or commercial uses at proposed residential dwellings.

2.5 If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates the difference between the rating level of the specific sound and the typical background sound level ($L_{A90,T}$) in the absence of the specific sound.

2.6 The Standard advises that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) the source in question operates or is proposed to operate in the future.

2.7 Comparing the rating level with the background sound level, BS 4142 states:

"Typically, the greater this difference, the greater the magnitude of impact.

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."

BS 8233:2014: Guidance on Sound Insulation and Noise Reduction for Buildings

2.8 This standard provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.

- 2.9 The guidance provided includes appropriate internal and external noise level criteria which are applicable to dwellings for steady external noise sources. It is stated that it is desirable that the internal ambient noise level does not exceed the following criteria set out in **Table 2.1** below:

Table 2.1: Summary of Internal Ambient Noise Levels to be achieved in Habitable Rooms when Assessed in Accordance with BS 8233

Activity	Location	Period	
		07:00 to 23:00 Hours, i.e. Daytime	23:00 to 07:00 Hours, i.e. Night-time
Resting	Living Room	35 dB LAeq, 16 Hour	-
Dining	Dining Room/area	40 dB LAeq, 16 Hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq, 16 Hour	30 dB LAeq, 8 Hour

- 2.10 Whilst BS 8233:2014 recognises that a guideline value may be set in terms of SEL or LA_{Fmax} for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated. Accordingly, reference has been made in this assessment to the World Health Organisation (WHO) 1999: *Guidelines for Community Noise* below.

World Health Organisation (WHO) 1999: Guidelines for Community Noise

- 2.11 The World Health Organisation (WHO) guidance: 1999: *Guidelines for community noise*. This document draws upon guidance from Vallet and Vernay, which states:

“For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB LA_{Fmax} more than 10-15 times per night”.

The Design Manual for Roads and Bridges (DMRB): LA111 Noise and Vibration (Revision 2)

- 2.12 This document sets out procedures for undertaking the environmental assessment of new road schemes, including the assessment of noise impacts from road traffic. In particular, it describes a method for assessing the severity of a noise impact, in terms of the number of people who will be bothered by any noise increases/decreases due to a new road scheme. When undertaking a DMRB assessment, the methodology contained within the Department for Transport 1988 document *Calculation of Road Traffic Noise (CRTN)* should be used to calculate levels of road traffic noise.
- 2.13 Although the DMRB strictly applies to new road schemes, the principles of the approach contained within the document can also be applied to the assessment of noise from road traffic in general. The Proposed Development has the potential to affect road traffic noise levels along existing roads, hence there is a need for such an assessment.
- 2.14 The DMRB assessment methodology suggests that the magnitude of noise changes from a project should be classified into levels of impact. LA111 considers how the magnitude of change can be affected by whether a noise level change occurs in the short term

(e.g., as a result of a sudden opening of a scheme), or in the long term (e.g., gradually over time, such as that associated with natural traffic growth).

- 2.15 The example classification scale for short term changes, which is the most stringent, is presented in **Table 2.2** below:

Table 2.2: Classification of Magnitude of Noise Impacts in the Short Term

Noise Change, dB L _{A10} , 18h	Magnitude of Impact
0	No Change
0.1 to 0.9	Negligible
1.0 to 2.9	Minor
3.0 to 4.9	Moderate
5.0+	Major

Consultation with Rochdale Borough Council

- 2.16 Consultation was undertaken with Paul Fletcher at RBC via email on 13 July 2023. A response was received via email on 14 July 2023 stating that the proposed methodology is acceptable, and to consider Condition 23 of planning permission 14/00542/OUT.

3. ASSESSMENT

Planning Condition 23

- 3.1 Condition 23 states that areas of the Site to the north of the line B-B and to the south of the line C-C would be required to achieve:
- 51 dB(A) L_{eq} (15 min) between the hours of 0700 and 2300 and 45 dB(A) L_{eq} (5 min) at any other time as measured at the façade of any noise sensitive property (or 48 dB(A) L_{eq} (15 min) and 42 dB(A) L_{eq} (5min) as free field measurements within the curtilage of any noise sensitive building) outside the boundaries of the site, and to the north of line B-B (or its linear projection) and to the south of line C-C (or its linear projection) shown on the Council's plan titled "Noise Control Plan"- condition 23, or within the boundary of the site and to the north of the line B-B and to the south of the line C-C.
- 3.2 It also states that areas of the Site to the north of the line C-C would be required to achieve:
- 48 dB(A) L_{eq} (15 min) between the hours of 0700 and 2300 and 43 dB(A) L_{eq} (5 min) at any other time as measured at the façade of any noise sensitive property (or 45 dB(A) L_{eq} (15 min) and 40 dB(A) L_{eq} (5 min) as free field measurements within the curtilage of any noise sensitive building) outside the boundaries of the site and to the north of the line C-C (or its linear projection) shown on Council's plan titled "Noise Control Plan"- condition 23, or within the boundary of the site and to the north of the line C –C.
- 3.3 An impact may be experienced at other receptors in other zones, however, given the greater distance, any impact is likely to be less than at those stated above.

Noise Model

- 3.4 In order to predict the noise levels from the proposed development site at the NSR, a detailed acoustic model of the Site has been generated using the PC based CadnaA® noise modelling package, applying the following prediction methodology:

- For industrial/commercial noise sources, the noise model was set to apply the noise prediction methodology set out in ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation¹.
- Mapping of the Site and the surrounding area was calibrated into the noise model based on known Ordinance Survey grid reference points.
- Topographical data for the ground levels across the Proposed Development and surrounding area, obtained from LIDAR data of 1m resolution, publicly available from the Department for Environment Food and Rural Affairs (DEFRA).
- To reflect the local ground cover, ground absorption was set to $G = 0.5$ (50% acoustically absorptive ground).
- The model was set to include second order reflected noise from solid structures.
- The Site layout as shown in **Figure 1.3** has been incorporated into the noise model in order to account for screening that is provided by the development itself.
- Off-site buildings which would provide screening to the Site have been incorporated as reflective façades.

Calculating the Specific Sound Level

- 3.1 The assumed quantity of deliveries in any 1-hour period, and 15-minute night-time period have been derived based on a maximum of 3 hourly two-way movements provided by the Transport Consultant as worst-case. **Table 3.1** presents noise measurement data for an HGV pass-by, to represent HGVs travelling along the Site access road.

Table 3.1: Summary of Historic HGV pass-by Noise Data used in Assessment

Source	Measurement distance (m)	Measurement duration (s)	Measured Sound Pressure Level	
			dB, $L_{Aeq,T}$	dB, $L_{A,f,max}$
HGV Pass-by	5	6	73	78

- 3.2 The noise levels from HGV passbys have been calculated using the Method for mobile plant using a regular well-defined route (e.g. haul roads) from BS 5228-1:2019+A1:20142. The following equation has been used:

$$L_{Aeq,1hr} = L_{WA} - 33 + 10 \log_{10} Q - 10 \log_{10} V - 10 \log_{10} (d) \quad (\text{BS5228-1:2009+A1:2014(F.6)}).$$

Where:

L_{WA}	sound power level of the plant;
Q	number of vehicles per hour; and
V	average vehicle speed in km/h.
d	distance in m.

¹ International Organization for Standardization (1996), ISO 9613-2:1996, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation

² British Standards Institute (2014), British Standard (BS) 5228-1:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites. Part 1: Noise

3.3 In calculating the level of noise produced by the Site access road, vehicle quantities (Q) discussed above and vehicle speed (V) of 10mph (16kmph) have been accounted for.

3.4 The sound power level of the plant (LWA) used in equation F.6 has been derived from the sound pressure level in **Table 3.1** using the following equation:

$$SWL = L_{Amax@10m} + 28$$

3.5 **Table 3.2** calculates the level of noise from the Site access roads as per the calculation detailed in BS 5228-1:2009+A1:2014.

Table 3.2: Calculation of Noise Level from the Access Road

Event	L _{WA}	Number of Vehicles per Period	Average Vehicle Speed in km/h	Sound pressure level of Access Road at 10m L _{Aeq,1hr}
HGV Pass-by	100	3	16	50

3.6 In calculating the level of noise produced by deliveries in the service yard, **Table 3.3** considers vehicles manoeuvring during arrival, departure, and during loading/unloading operations.

Table 3.3: Calculated Sound Pressure Level at 10m – Level Access Door

Event	Sound Pressure Level, L _{Aeq,T} (dB)	Measurement Distance (m)	Assumed, On-time per Period (s)	Time Corrected, Sound Pressure Level @10m, L _{Aeq,T} (dB)
Daytime 1-hour				
HGV Delivery including arriving/departing, impact noise and cases being wheeled	66	5	1800 ¹	57
Night-time 15-minutes				
HGV Delivery including arriving/departing, impact noise and cases being wheeled	66	5	900	60
¹ On-time during 3600s daytime period				
² On-time during 900s night-time period				

3.7 Using the data contained within **Tables 3.2** to **3.3**, the following noise inputs have been converted into sound power levels assuming line source and point source attenuation respectively, and subsequently included within the model as described below:

- Specific sound levels from the HGVs have been calculated using equation F.6 detailed in BS 5228-1:2009+A1:2014 based on indicative number of HGV trips provided by the Applicant. These have been included in the model as a line source at a height of 1.5m using the calculated sound pressure level in **Table 3.2**.
- Unloading operations associated with deliveries to site within the service yard is based on the daily number of deliveries to the Site provided by the design team. These have been included in the model as a point source at a height of 1.5m using the combined, time-corrected sound pressure Level in **Table 3.3**.

3.8 Noise contour maps have been generated in outdoor living areas at heights of 1.5m and 4m for the daytime and night-time respectively. The resultant daytime and night-time specific sound levels are presented in **Figure 3.1** and **Figure 3.2**.

Figure 3.1: Daytime Noise Contours of Specific Noise Levels – Calculation at 1.5m Above Ground

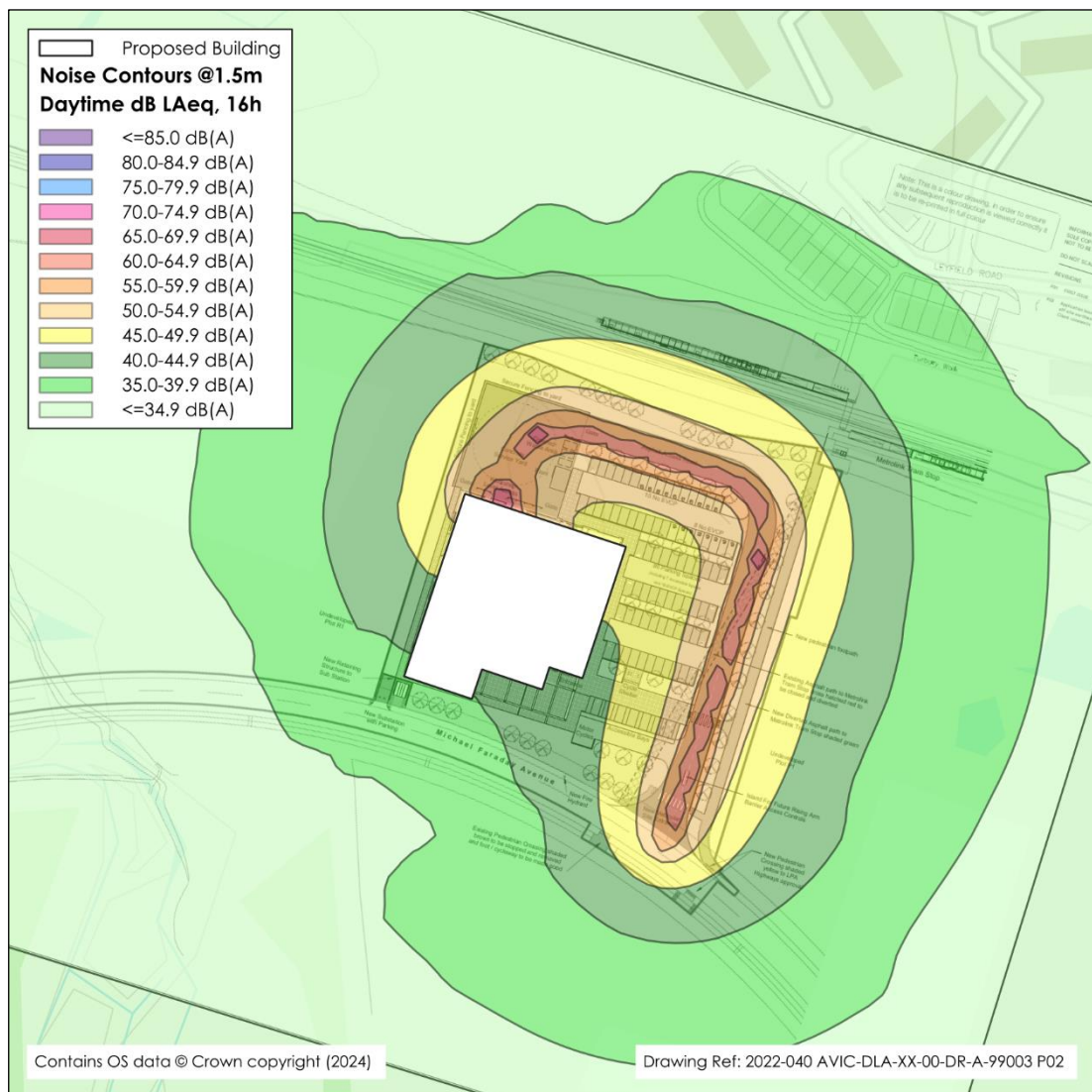
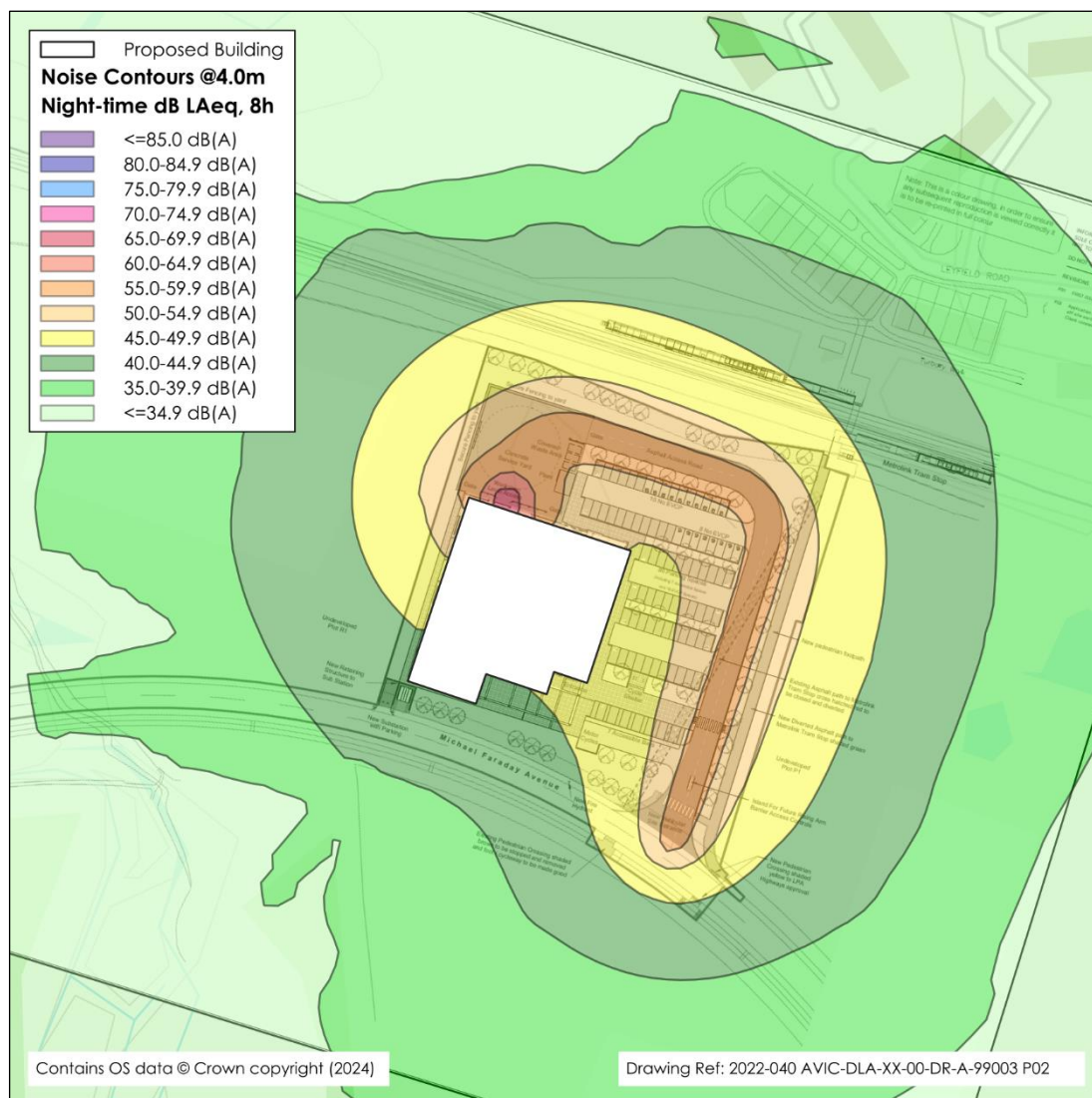


Figure 3.2: Night-time Noise Contours of Specific Noise Levels – Calculation at 4m Above Ground



3.9 The specific sound levels at the NSR have been calculated as receiver points at 1.5m above ground for the daytime, and 4m above ground for the night-time. The calculated levels due to operations during each period are presented in **Table 3.4**.

Table 3.4: Predicted Specific Sound Level at NSRs, Ls dB

NSR	Daytime Ls, dB	Night-time Ls, dB
1	37	41
2	26	28

3.10 The predicted noise levels at receiver points in the CadnaA® model have been included within the subsequent assessment.

Rating Level

- 3.11 In accordance with BS 4142: 2014+A1:2019, penalties are applied to the specific sound level in order to provide the rating level. These penalties relate to the acoustic features of the sound source.
- 3.12 For NSR 2, it is considered that acoustic characteristics beyond the existing noise climate at the JD distribution centre are unlikely to be perceptible at the NSRs, and any perceptible characteristics associated with operations is likely to be similar to that which currently exist from nearby commercial. As such, no penalties have been applied for the assessment of NSR 2.
- 3.13 For NSR 1, there may be perceptible tonality from reverse alarms in the service yard from the north west boundary of the Site, however, given the main noise source contribution is due to the Site access road rather than manoeuvring in the service yard, and the infrequency of deliveries i.e. up to 2 no. per period, it has not been considered warranted to apply a penalty to the overall specific sound level.

Assessment of Impact

- 3.14 The predicted rating level at NSR 1 has been assessed in accordance with BS 4142, and Condition 23, see **Table 3.5**.

Table 3.5: BS 4142 Assessment of Impact

Description	NSR 1		NSR 2		Relevant BS 4142 Clause
	Daytime (07:00 – 23:00) Noise Levels (dB)	Night-time (07:00 – 23:00) Noise Levels (dB)	Daytime (07:00 – 23:00) Noise Levels (dB)	Night-time (07:00 – 23:00) Noise Levels (dB)	
Specific sound level	37 LAeq,1hour	41 LAeq,15min	26 LAeq,1hour	28 LAeq,15min	7.3.5
Acoustic feature correction ²	0	0	0	0	9.2
Rating level	37 LAeq,1hour	41 LAeq,15min	26 LAeq,1hour	28 LAeq,15min	9.2
Condition 23 Criterion	48 LAeq, 1hour	42 LAeq,15min	45 LAeq, 1hour	40 LAeq,15min	-
Achieved?	Yes	Yes	Yes	Yes	-

- 3.15 During the daytime period, the rating level achieves the noise limits as set out in Planning Condition 23. As such, consideration to mitigation is not warranted.

Noise from Fixed Plant

- 3.16 It is anticipated that there may be additional fixed plant and equipment associated with the Proposed Development that may have the potential to generate noise.

However, at this stage details of the proposed type, number, and precise location of any such plant or the nature of its operation are not available. In the absence of detailed information, it is appropriate to specify suitable noise control limits to which any plant should conform. These limits should include any appropriate corrections for acoustic characteristics, in accordance with BS 4142.

- 3.17 In the absence of detailed information, it is appropriate to specify suitable noise level limits to which any proposed plant should conform based on the requirements of Condition 23 and the prediction contribution of HGV noise.
- 3.18 Noise from fixed plant is considered for the area between A-A and B-B, as receptors further afield (i.e. in the zoning areas beyond this) would be subject to lower noise levels.
- 3.19 By subtracting the predicted worst case HGV noise levels from the noise limits in Condition 23 the following noise limits would be applicable for the cumulative effect of all other noise sources from the development to the north of the line B-B and to the south of the line C-C.
- 48 dB(A) L_{eq} (15 min) and 35 dB(A) L_{eq} (5min), free field.
- 3.20 For areas of the Site to the north of the line C-C would be required to achieve:
- 45 dB(A) L_{eq} (15 min) and 40 dB(A) L_{eq} (5 min), free field.
- 3.21 It should be noted that the derived limits would be applicable to the total noise from the simultaneous operation of all external plant serving the proposed development. As such, noise emissions from individual items of plant will need to be lower than the given limits, although the exact limit for each individual item of plant will be dependent upon its type, noise characteristics, location etc.
- 3.22 Plant manufacturers can typically design plant to meet required limits. Therefore, assuming plant are designed to meet the limits proposed above. This issue is best addressed during the detailed design stage.

Noise from the Car Park

- 3.23 The car park associated with Plot R2 AVIC is noted as being approximately 80m from the nearest sensitive receptor. Given the number of car parking spaces, and the intervening distance, it is considered unlikely that energy-averaged noise levels ($L_{Aeq,T}$), would result in impacts at the nearest sensitive receptors.
- 3.24 However, noise from individual events within the car park (e.g. car doors slamming) require further consideration, particularly during the more sensitive night-time period when occupant of nearby NSRs may be subject to sleep disturbance. Such events are assessed in terms of the L_{AFmax} noise parameter during the night-time period (23:00 to 07:00) in accordance with the guidance set out in the WHO *Guidelines for Community Noise*.
- 3.25 Based on a maximum noise level of 72 dB L_{AFmax} for a car door slamming, measured at a distance of 10m, the resulting noise level at a distance of 80m away (i.e. the distance

to the location of NSR1) is predicted to be 54 dB L_{AFmax} . This is predicted using the distance attenuation correction for a point source.

- 3.26 Based on the assumption that a partially open window provides 15 dB of noise attenuation, as is stated in BS 8233, the 54 dB level at the façade of NSR1 would equate to an internal maximum noise level of 39 dB, which is below the guideline criterion of 45 dB set out in the WHO guidance. It should also be noted that the predicted noise level of 43 dB is based on a car door slamming at the nearest possible distance within the car park. The majority of parking spaces are located a greater distance away from NSR1, and consequently, would be exposed to noise levels which are further reduced.

Noise from the Function Space

- 3.27 The function space associated with Plot R2 AVIC is noted as being approximately 100m from the nearest sensitive receptor. There is the potential for evening/weekend events and functions which have the potential to generate noise. However, given the intervening distance to the receptors, and that any events will be internal to the building, it is considered unlikely that noise associated with the event space would exceed the requirements of the noise related planning conditions.

Development Generated Road Traffic

- 3.28 An increase in road traffic due to the proposed development has the potential to increase the noise levels at NSRs in the vicinity of the site.
- 3.29 Traffic data have been provided by the project transport consultant as 18-hour Annual Average Weekday Traffic (AAWT). The traffic data have been provided for the following scenarios:
- Opening Year – Base; and,
 - Opening Year – Base + Proposed Development.
- 3.30 The Basic Noise Level (BNL), as referenced in the Calculation of Road Traffic (CRTN), has been calculated for the roads nearest to the NSRs, to predict the change in noise level between opening year with and without the development.
- 3.31 The results of the traffic assessment have been used as the basis for determining the change in road traffic noise levels that would result from development generated traffic.
- 3.32 Road traffic noise calculations have been carried out in accordance with CRTN, and have been undertaken for a notional receptor location 10m from the edge of the carriageway of each road considered, and 1.5m above ground level. A notional receptor has been used because the change in traffic noise level adjacent to any given road will be the same at all distances where noise from that route is dominant. Traffic noise calculations have been undertaken to establish the change in the weekday daytime $L_{A10,18h}$ noise level.

- 3.33 To quantify any potential short-term impacts, calculations have been undertaken for the opening year both with and without the proposed development. Road traffic speeds have been applied based on information provided by the Transport Consultant. The results are presented in **Table 3.6**.

Table 3.6: Opening Year road traffic BNLs, daytime 18-hour, dB(A)

Road Link	No development, BNL	With development, BNL	Change in Noise Level Due to Proposed Development
Michael Faraday Avenue (south of roundabout)	61.0	61.1	+0.1
Michael Faraday Avenue (north of roundabout)	57.0	57.4	+0.4

- 3.34 For the road links assessed in the opening year, there is predicted to be up to a +0.4dB increase in noise level due to development generated traffic. In accordance with DMRB, this is therefore likely to result in a negligible impact during the daytime as a result of the additional road traffic in the short term.
- 3.35 Based on the above, no further consideration of mitigation is considered warranted at this time.

4. CONCLUSION

- 4.1 This Noise Assessment has been undertaken on behalf of Wilson Bowden Developments Ltd & Rochdale Borough Council for the erection of a research & development building (Use Class E) including office, laboratory & production space, function space & café, new access, car parking, servicing, boundary treatments, hard and soft landscaping and other associated works at Plot R2 AVIC Kingsway Business Park, Rochdale
- 4.2 The results of the noise impact assessment indicate that the effects of operational noise on to the nearest noise sensitive receptors to the proposed development would achieve the limits in Condition 23.
- 4.3 Appropriate noise level limits have been set for fixed plant items in accordance with BS 4142:2014, to ensure that noise from fixed plant and equipment has a low impact at nearby residential receptors.
- 4.4 The assessment of the potential noise impact from car park usage indicates that at the worst affected receptors, there is not likely to be a significant effect from this noise.
- 4.5 The assessment also considers development generated road traffic noise on the surrounding road network in accordance with the general principles from DMRB and predicts a negligible impact.
- 4.6 Based on the results of the assessment, it has been demonstrated that the Site is suitable for proposed development. It is therefore considered that noise need not be a determining factor in the granting of full planning approval for the Site.

APPENDICES

APPENDIX A: Glossary of Terms

Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

Table A.1: Acoustic Terminology

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10 ⁻⁵ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
L _{Aeq,T}	L _{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L _{Amax}	L _{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L _{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L _{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L ₁₀ and L ₉₀	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L _n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L ₁₀ is the level exceeded for 10% of the time, and the L ₉₀ is the level exceeded for 90% of the time.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Façade Level	A sound field determined at a distance of 1 m in front of a large sound reflecting object such as a building façade.

APPENDIX B: Planning Condition 23

Planning Condition 23

