Plot H, Manchester

Construction Noise, Vibration and Road Traffic Noise Assessment

27th November 2025

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1. Executive Summary

Project Overview

Heyda Ltd has been commissioned to conduct a construction noise and vibration impact assessment for the Proposed Development at Plot H, situated in Manchester City Centre, on behalf of RGRE Ltd, ID Manchester Ltd and The University of Manchester.

The Proposed Development comprises the redevelopment of the Plot H site for Purpose Built Student Accommodation, with ancillary commercial uses, landscaping, access and associated works.

This report has been prepared to accompany the Noise and Vibration Environmental Statement (ES) Chapter for the proposed development and the associated planning application process.

Objectives and Compliance

The primary objective of this assessment is to evaluate the potential noise and vibration impacts of on-site construction activities on nearby sensitive receptors and structures and recommend appropriate mitigation strategies to minimise disruption. The report has been prepared in accordance with BS 5228:2009+A1:2014, Noise and Vibration Control on Construction and Open Sites, ensuring compliance with local planning conditions and national standards.

In addition, this assessment also considers potential changes in road traffic noise during the construction phase, carried out with reference to the Design Manual for Roads and Bridges (DMRB) LA 111 – Noise and Vibration (2020), which provides criteria for assessing the significance of changes in road traffic noise.

Methodology

The assessment of on-site construction noise and vibration activities has set construction noise and vibration thresholds based on BS 5228 guidance. A 3D noise model using the ISO 9613-2:2024 methodology has been developed to predict noise levels at the nearest receptors for each phase of construction. Similarly, vibration impacts were predicted using data from BS 5228 and the Federal Transit Administration's (FTA) vibration assessment guide. These predictions consider the proximity of sensitive receptors, expected equipment usage, and site layout.

In addition to on-site works, potential changes in road traffic noise during the construction phase have been assessed in accordance with the Design Manual for Roads and Bridges (DMRB) LA 111 – Noise and Vibration (2020). Using the baseline and construction phase traffic flow data provided by the transport team, the assessment predicts corresponding road traffic noise levels and evaluates the magnitude and significance of any changes during the construction period on surrounding roads.

Impact Assessment

- **Noise (On-site Construction Works):** Predicted construction noise levels are in many instances within acceptable thresholds at most sensitive receptors,

however there are instances where the "significant effect" thresholds are expected to be exceeded. This is predominantly down to the short distances between the site and sensitive receptors.

- **Vibration (On-site Construction Works):** Predicted vibration levels are generally within the thresholds for significant adverse effects and cosmetic damage at all surrounding receptors and sensitive structures. However, exceedances of the significant adverse effect threshold may occur when vibratory rollers operate in close proximity to the site boundaries and close to the nearest occupied sensitive receptor buildings and the adjacent elevated railway structure.

- **Noise (Construction Phase Road Traffic):** Predicted changes in road traffic noise resulting from construction-phase vehicle movements have been assessed in accordance with DMRB LA 111 – Noise and Vibration (2020). The calculated increases in noise levels on all surrounding roads, including Charles Street and Sackville Street, are expected to remain below the threshold of perceptibility defined for short-term significance (i.e., less than 1 dB $L_{A10,18hr}$). As such, no significant adverse noise effects are predicted to occur as a result of construction-related traffic.

Mitigation Strategies

The assessment outlines a comprehensive set of mitigation measures following Best Practicable Means (BPM), including:

- Use of quieter, modern construction equipment.
- Application of site hoarding and acoustic barriers to reduce noise propagation.
- Scheduling high-impact activities during agreed working hours.
- Continuous monitoring of noise and vibration to ensure compliance with thresholds.

Monitoring and Compliance

A robust noise and vibration monitoring strategy has been proposed, including the use of continuous monitors at key locations. Real-time monitoring and alerts will enable proactive management of any threshold exceedances, ensuring that mitigation measures are adjusted promptly.

Community Liaison and Communication

The report underscores the importance of community engagement. The contractor is encouraged to implement a community liaison strategy, including:

- Regular updates to local residents, building occupants and stakeholders.
- A dedicated enquiry line for complaints or questions.
- Advanced notice of high-impact construction activities. This proactive approach will foster transparency and maintain positive relationships with the surrounding community.

Conclusion

This noise and vibration impact assessment concludes that, with the recommended mitigation measures, continuous monitoring, and community liaison strategies in place, the proposed development will effectively manage potential noise and vibration impacts during the construction phase. The outlined measures will support the successful and responsible delivery of the development.

2. Introduction

Heyda Ltd has been commissioned to conduct a construction noise and vibration impact assessment for the Proposed Development at Plot H, situated in Manchester City Centre, on behalf of RGRE Ltd, ID Manchester Ltd and The University of Manchester.

The Proposed Development comprises the redevelopment of the Plot H site for Purpose Built Student Accommodation, with ancillary commercial uses, landscaping, access and associated works.

This assessment has been prepared to identify, quantify, and evaluate potential noise and vibration impacts arising during the construction phases of the development. It provides a detailed appraisal of potential effects on surrounding sensitive receptors and sets out appropriate mitigation and management measures to ensure that impacts are effectively controlled and remain within acceptable limits.

The methodology adopted in this report follows the guidance set out within BS 5228:2009+A1:2014 (Code of Practice for Noise and Vibration Control on Construction and Open Sites) and incorporates relevant legislative, policy, and local authority guidance documents. The assessment considers the following key components:

- An overview of the existing site setting and surrounding noise environment;
- A description of the proposed construction methodologies;
- Identification of nearby sensitive receptors;
- Quantitative predictions of noise and vibration levels generated by key phases of work; and
- Recommendations for mitigation and management through the adoption of Best Practicable Means (BPM) to minimise disturbance to the surrounding community.

In addition to assessing noise and vibration from on-site works, this report also considers potential changes in road traffic noise during the construction phase. This has been undertaken with reference to the Design Manual for Roads and Bridges (DMRB) LA 111 – Noise and Vibration (2020), which provides criteria for assessing the significance of changes in road traffic noise.

3. Policy, Standards and Guidance Documents

The noise and vibration impact assessment for the proposed redevelopment of Plot H site in Manchester has been prepared in line with the following key legislative and policy documents, which form the basis for the assessment methodology and mitigation measures:

- **Planning and Noise – Technical Guidance, Manchester City Council 2022:** Section 3.7.1.4 – Construction / Demolition Phases sets out the Council's requirements for controlling noise and vibration from construction and demolition activities. It establishes standard working hours for audible site operations and deliveries (typically 07:30 – 18:00 Monday–Friday, 08:30 – 14:00 Saturday, with no works on Sundays or Bank Holidays) and encourages the use of a Considerate Contractors Scheme to minimise disruption to local residents and businesses. The guidance also requires that large or long-term developments submit a Construction Management Plan (CMP) containing a dedicated Noise and Vibration section based on BS 5228-1 and BS 5228-2, together with a community consultation strategy detailing how local stakeholders will be informed of works and potential out-of-hours activities.
- **British Standard BS 5228:2009+A1:2014 'Noise and Vibration Control on Construction and Open Sites':** Provides comprehensive guidance on assessing, managing, and mitigating noise and vibration on construction sites. It includes thresholds for noise and vibration, methodologies for assessment, and source noise data for construction activities, serving as a crucial reference for ensuring that impacts are kept within acceptable limits.
- **Control of Pollution Act 1974, Section 61:** Provides the legal framework by which contractors can apply for prior consent to manage potential noise and vibration impacts from construction activities. Applying for consent under this section offers protection against enforcement actions under Section 60 of the Act.
- **Control of Pollution Act 1974, Section 60:** Sets out the conditions under which local authorities may serve notices to control noise from construction sites, specifying permissible noise levels and times of operation.
- **Control of Pollution Act 1974, Section 72:** Defines the Best Practicable Means (BPM) necessary for minimising noise and vibration during construction. BPM involves employing the most suitable mitigation techniques available that are practical and cost-effective.
- **Federal Transit Administration's Transit Noise and Vibration Impact Assessment Manual, May 2006:** Provides additional guidance on predicting and assessing noise and vibration impacts, particularly for projects involving complex construction phases or sensitive receptors, offering criteria for impact severity and mitigation.
- **Design Manual for Roads and Bridges (DMRB) LA 111 – Noise and Vibration (Revision 2, 2020):** Provides the standard methodology for assessing noise and vibration effects from road traffic associated with infrastructure and development projects. It sets out thresholds for identifying significant impacts due to changes in traffic flows.

These documents collectively inform the methodologies employed in this assessment, guiding the development of effective strategies to mitigate noise and vibration and ensure the project aligns with both local policies and national legislation. This approach ensures that the impacts on the surrounding community are effectively managed and minimised.

4. Site Location and Proposed Development

4.1. Site Description

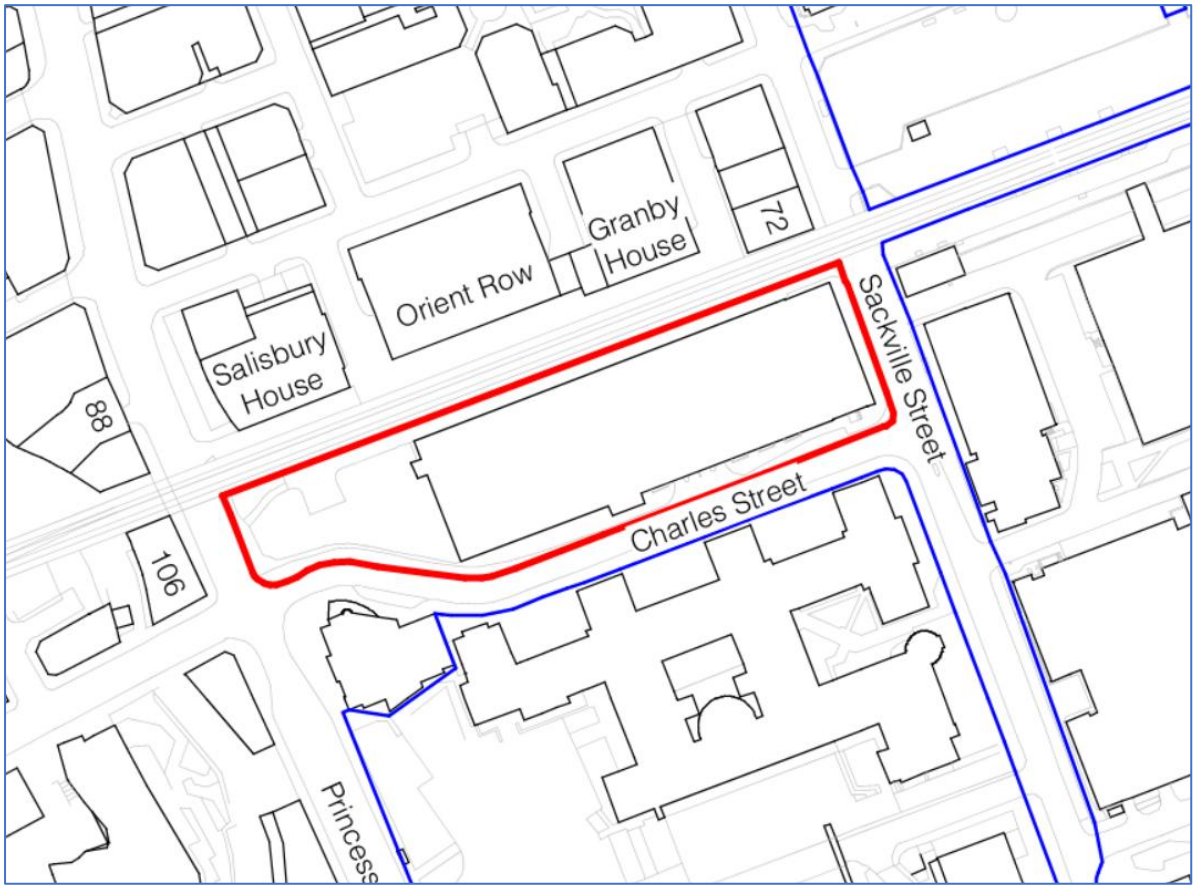
The Site is in Manchester City Centre and is bound by Charles Street to the south, Manchester South Junction and Altrincham Railway Viaduct and Granby Row to the north, Sackville Street to the east and Princess Street to the west. The red line encompasses all highways works proposed as part of the Proposed Development.

The Site currently comprises the vacant Charles Street multi-storey car park and three ancillary commercial uses, all of which are now vacant. As of today (October 2025) the buildings are in situ.

While the Site is not located within a Conservation Area, the Site's northern boundary lies adjacent to the Whitworth Street Conservation Area.

The Site location is illustrated in Figure 1 below.

Figure 1: Site Location



The surrounding area features a range of sensitive receptors, primarily comprising of private residential properties, PBSA residences, hotels and educational/research buildings, which have been identified and considered in the subsequent noise and vibration assessment. The receptors listed below have been selected as the nearest and

most representative of each building use type, ensuring a focused and relevant analysis of potential impacts:

Private Residential:

- West: 90 Princess Street
- North-west: Salisbury House
- North: Orient House
- North: Granby House
- North: Fairbairn Building
- North: 1 Samuel Ogden Street
- North: Granby Village
- South-west: Montana House

PBSA Residences/Hotels:

- North: 121 Princess Street
- South: Pendulum Hotel / Weston Halls (PBSA)
- South-west: Ibis Hotel
- West: Vita Students

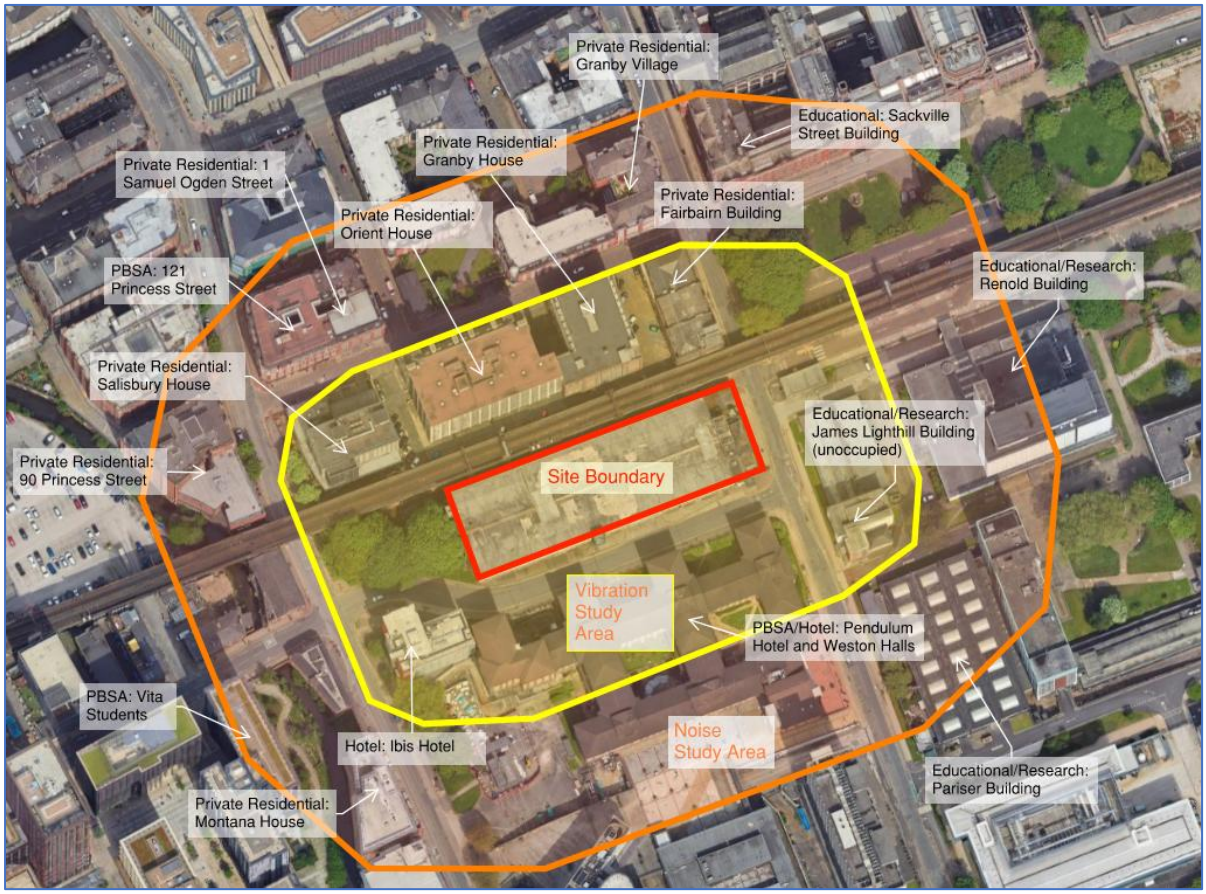
Educational/Research Buildings:

- North-east: Sackville Street Building
- East: James Lighthill Building (understood to be currently unoccupied, but included for completeness)
- South-east: Pariser Building
- East: Renold Building

Furthermore, an elevated railway line is located directly to the north of the site, serving Manchester Oxford Road and Manchester Piccadilly Stations. Network Rail has confirmed that this structure is sensitive to vibration, and it has therefore been explicitly considered within the construction vibration assessment to ensure appropriate safeguards are in place against any potential structural or operational impacts.

A visual representation of the site, including the site boundary and the study areas, and its surroundings, including the nearest sensitive receptors, is illustrated in Figure 2 below.

Figure 2: Site Boundary, Study Areas and Sensitive Receptors



4.2. Proposed Development and Construction Works

The Proposed Development comprises Purpose Built Student Accommodation (PBSA) with ground floor flexible commercial floorspace across three buildings of 8, 11 and 38 storeys, connected by a five-storey podium.

The relevant ground and roof top GA Layouts are presented in Figures 3 and 4 below.

In addition, Figure 5 below presents the logistics GA layout of the site during the construction phase.

Figure 3: Proposed Ground Floor GA Layout



Figure 4: Proposed Roof GA Layout

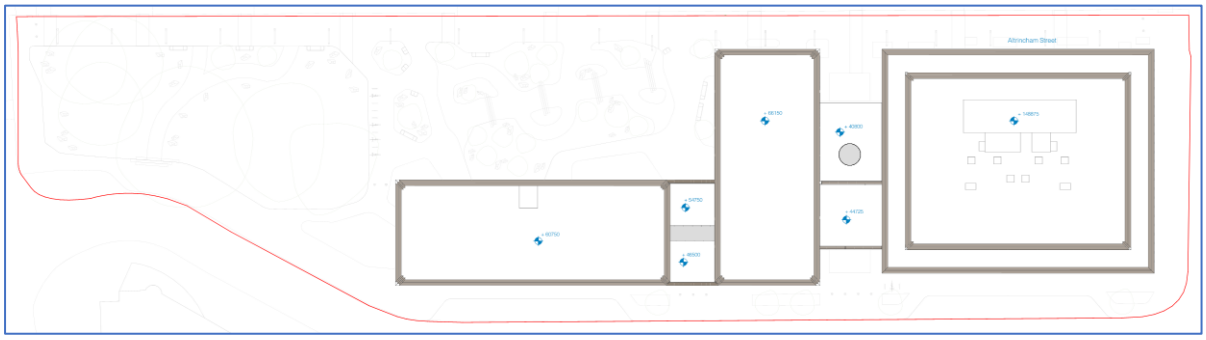
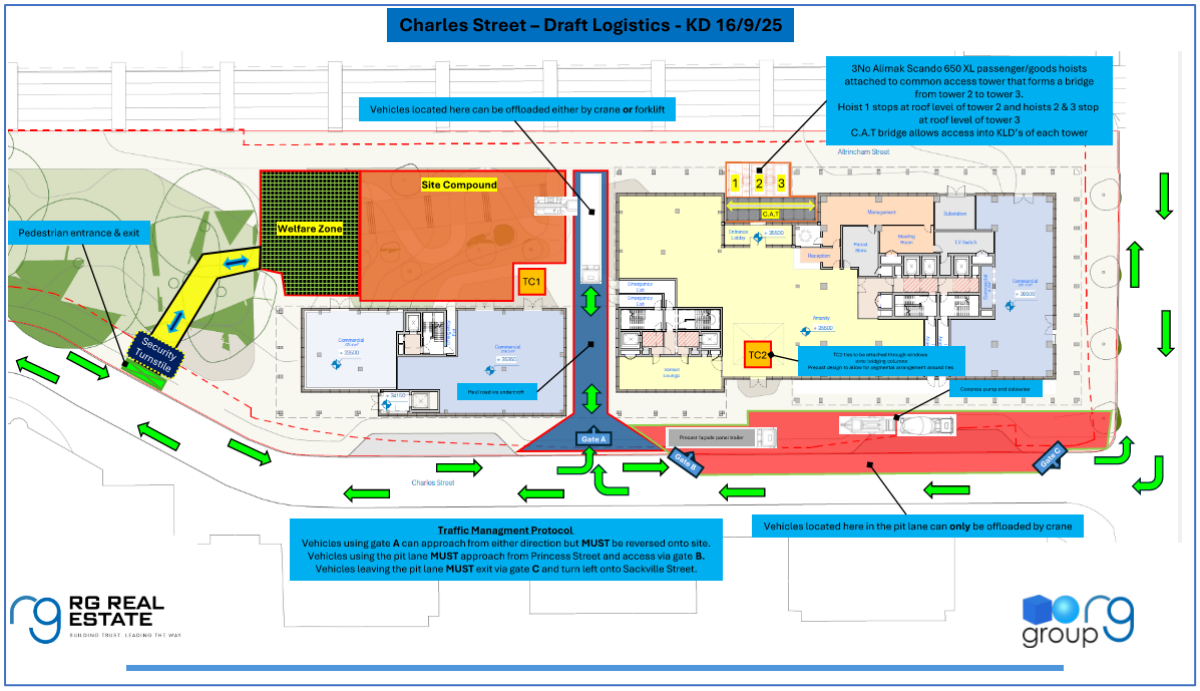


Figure 5: Proposed Construction Logistics GA Layout



Based on information provided by the Client, the construction works covered by this assessment will comprise of the following primary construction phases:

- Phase 1: Piling Mat Installation
- Phase 2: Piling Works (CFA)
- Phase 3: Superstructure
- Phase 4: Building Envelope
- Phase 5: Fit-out

The schedule of assumed construction plant/machinery/activities, used as a basis of this assessment, is detailed in Appendix B of this report. These have been based on information provided by the Client and Contractor.

5. Construction Works Noise Impact Assessment

5.1. Assessment Method

An assessment has been conducted to predict construction noise emissions at the nearest noise-sensitive receptors in accordance with BS 5228-1:2009+A1:2014. The method comprises the following steps:

1. Identify appropriate construction noise thresholds at which significant adverse effects may occur, at which an offer of noise insulation would be required, and at which temporary/permanent rehousing may be necessary.
2. Identify suitable source noise levels, based on the plant information provided by the contractor, by referencing the noise level database in BS 5228.
3. Construct a 3D noise model and insert the plant noise sources in appropriate locations, representative of the likely worst-case scenario.
4. Predict the construction noise levels, using the 3D noise model, at the nearest noise sensitive receptors in accordance with ISO 9613.
5. Compare the predicted noise levels against the various noise thresholds.
6. Determine whether mitigation measures are required to protect nearby receptors from construction noise.
7. Conclude on the significance of the predicted noise levels once accounting for the proposed mitigation measures.

5.2. Working Hours

It is understood that all works will be carried out during normal daytime hours only, with the following proposed construction working hours:

- 07.30 – 18.00 Monday to Friday
- 08.30 – 14.00 Saturdays

No works are proposed to be carried out on Sundays or Bank Holidays.

5.3. Construction Noise Thresholds

BS 5228 presents different noise thresholds, exceedance of which triggers different responses. These are as follows:

1. **Significant Effect:** BS 5228 provides the "ABC method" and the "5 dBA change method" which are used to define the construction noise level above which significant effect could occur at a noise sensitive receptor. Where this level is exceeded, it will be essential that Best Practicable Means (BPM) for noise reduction are employed, and community liaison is used to make residents/building users aware of what works are being undertaken and how long they will last.
2. **Noise Insulation:** BS 5228 provides fixed thresholds above which noise insulation should be offered to the occupants of the nearest noise sensitive

receptors. Noise insulation normally comprises secondary glazing with alternative means for ventilation where necessary. This is only applicable to permanently occupied residential dwellings.

3. **Temporary Rehousing:** BS 5228 provides fixed thresholds above which temporary or permanent re-housing should be offered to occupants of the nearest noise sensitive receptors. This is only applicable to permanently occupied residential dwellings.

The thresholds have been established based on the pre-existing ambient noise levels measured on site and at surrounding areas by Blackbird Acoustics in support of the wider ES Chapter (report ref. '2151.Rep.AAR dated 19th November 2025). The full details of the noise survey can be found in that report, however for simplicity, the measurements relevant to this assessment have been summarised below:

Table 1: Measured Pre-existing Ambient Noise Levels

Blackbird Acoustics Measurement ref.	Location	Period	Measured $L_{Aeq,T}$ dB
Position 1 (P1)	North-eastern corner facing the railway – representative of receptors to the north of the site	Weekday Daytime Working Hours (07:30 – 18:00)	66
		Saturday Daytime Working Hours (08:30 – 14:00)	65
Position 2 (P2)	South-western corner overlooking Charles St/Sackville St – representative of receptors to the south-east and east of the site	Weekday Daytime Working Hours (07:30 – 18:00)	62
		Saturday Daytime Working Hours (08:30 – 14:00)	61
Position 3 (P3)	South-western corner overlooking Charles St – representative of receptors to the south-west and west of the site	Weekday Daytime Working Hours (07:30 – 18:00)	62
		Saturday Daytime Working Hours (08:30 – 14:00)	60

Based on the above measured ambient noise levels, the various noise limits applicable to the nearest sensitive receptor locations are summarised below, in accordance with the 5 dBA change method. Numbers have been rounded to the nearest integer.

Table 2: Construction Noise BS5228 Limits (Private Residential Receptors)

Receptor	Period	Measured Ambient Noise Level, dB $L_{Aeq,T}$	BS5228 Total Noise Limit (Ambient + Construction Noise), dB $L_{Aeq,T}$	BS5228 Construction Noise Limit, dB $L_{Aeq,T}$
90 Princess St Salisbury House Orient House Granby House Fairbairn Building 1 Samuel Ogden St Granby Village	Weekday Daytime	66 (using P1)	71	69
	Saturday Daytime	65 (using P1)	70	68
Montana House	Weekday Daytime	62 (using P3)	65	63
	Saturday Daytime	60 (using P3)	67	65

Table 3: Construction Noise BS5228 Limits (PBSA/Hotel Receptors)

Receptor	Period	Measured Ambient Noise Level, dB $L_{Aeq,T}$	BS5228 Total Noise Limit (Ambient + Construction Noise), dB $L_{Aeq,T}$	BS5228 Construction Noise Limit, dB $L_{Aeq,T}$
121 Princess St	Weekday Daytime	66 (using P1)	71	69
	Saturday Daytime	65 (using P1)	70	68
Pendulum Hotel/Weston Halls	Weekday Daytime	62 (using P2)	67	65
	Saturday Daytime	61 (using P2)	66	64
Ibis Hotel Vita Students	Weekday Daytime	62 (using P3)	67	65
	Saturday Daytime	60 (using P3)	65	63

Table 4: Construction Noise BS5228 Limits (Educational/Research Buildings)

Receptor	Period	Measured Ambient Noise Level, dB $L_{Aeq,T}$	BS5228 Total Noise Limit (Ambient + Construction Noise), dB $L_{Aeq,T}$	BS5228 Construction Noise Limit, dB $L_{Aeq,T}$
Sackville Street Building	Weekday Daytime	66 (using P1)	71	69
	Saturday Daytime	65 (using P1)	70	68
James Lighthill Building Pariser Building Renold Building	Weekday Daytime	62 (using P2)	67	65
	Saturday Daytime	61 (using P2)	66	64

Based on the above, the noise thresholds applicable to the nearest sensitive receptor locations are summarised as follows:

Table 5: BS 5228 Construction Noise Thresholds (Private Residential Receptors)

Receptor	Period	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
90 Princess St Salisbury House Orient House Granby House Fairbairn Building 1 Samuel Ogden St Granby Village	Weekday Daytime	69	75	85
	Saturday Daytime	68	75	85
Montana House	Weekday Daytime	63	75	85
	Saturday Daytime	65	75	85

Table 6: BS 5228 Construction Noise Thresholds (PBSA/Hotel Receptors)

Receptor	Period	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
121 Princess St	Weekday Daytime	69	75	85
	Saturday Daytime	68	75	85
Pendulum Hotel/Weston Halls	Weekday Daytime	65	75	85
	Saturday Daytime	64	75	85
Ibis Hotel Vita Students	Weekday Daytime	65	75	85
	Saturday Daytime	63	75	85

Table 7: BS 5228 Construction Noise Thresholds (Educational/Research Receptors)

Receptor	Period	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
Sackville Street Building	Weekday Daytime	69	-*	-*
	Saturday Daytime	68	-*	-*
James Lighthill Building Pariser Building Renold Building	Weekday Daytime	65	-*	-*
	Saturday Daytime	64	-*	-*

*Not applicable to non-residential receptors

An offer of noise insulation or temporary re-housing is only normally required where the threshold is exceeded for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months.

5.4. Construction Plant Noise Levels

The magnitude of the potential impact will depend on the type of activity, period of operation, source to receiver distance, ground absorption and reflections.

Construction noise predictions have been based on the construction plant/machinery/activity likely to be used at the site during each of phase. The sound

data for the various construction plant and activities are largely based on sound data from BS5228-1, with all references provided.

The calculations are based on the quantity and a percentage on-time for each plant/machinery/activity. The percentage on-time covers periods when a specified tool, machine or activity is in peak operation. Using the sound power level data from manufacturer data sheets and from BS 5228-1, the total sound power level for each phase of works has been calculated.

Appendix B outlines the construction plant, machinery and activities considered in the assessment, along with the quantity and the expected percentage on-time for each plant/machinery/activity, as provided by the Client and Contractor.

5.5. Noise Model

The construction noise model was developed using the Datakustik Cadna/A software package, applying the ISO 9613-2:2024 noise prediction methodology. This sound propagation model facilitates precise prediction of noise levels at each assessment location, considering critical factors such as geometric spreading, acoustic screening, and reflections.

Based on the construction programme and information provided by the Client, the assessment was segmented into five primary phases, as outlined in Section 4.2. Noise levels for each phase were modelled using the following methodology:

- **P1 – Substructure (Piling Mat):** Single area source covering the entire site was used to represent piling mat installation, situated at a height of 1.5m above ground level and. The sound power levels were sourced from Appendix B. Existing building structures were omitted to align with the post-demolition scenario.

- **P2 – Substructure (CFA Piling):** Similar to Phase 1, a single area source covering the entire site was used to represent the proposed piling works, situated at a height of 1.5m above ground level and. The sound power levels were sourced from Appendix B. Existing building structures were omitted to align with the post-demolition scenario.

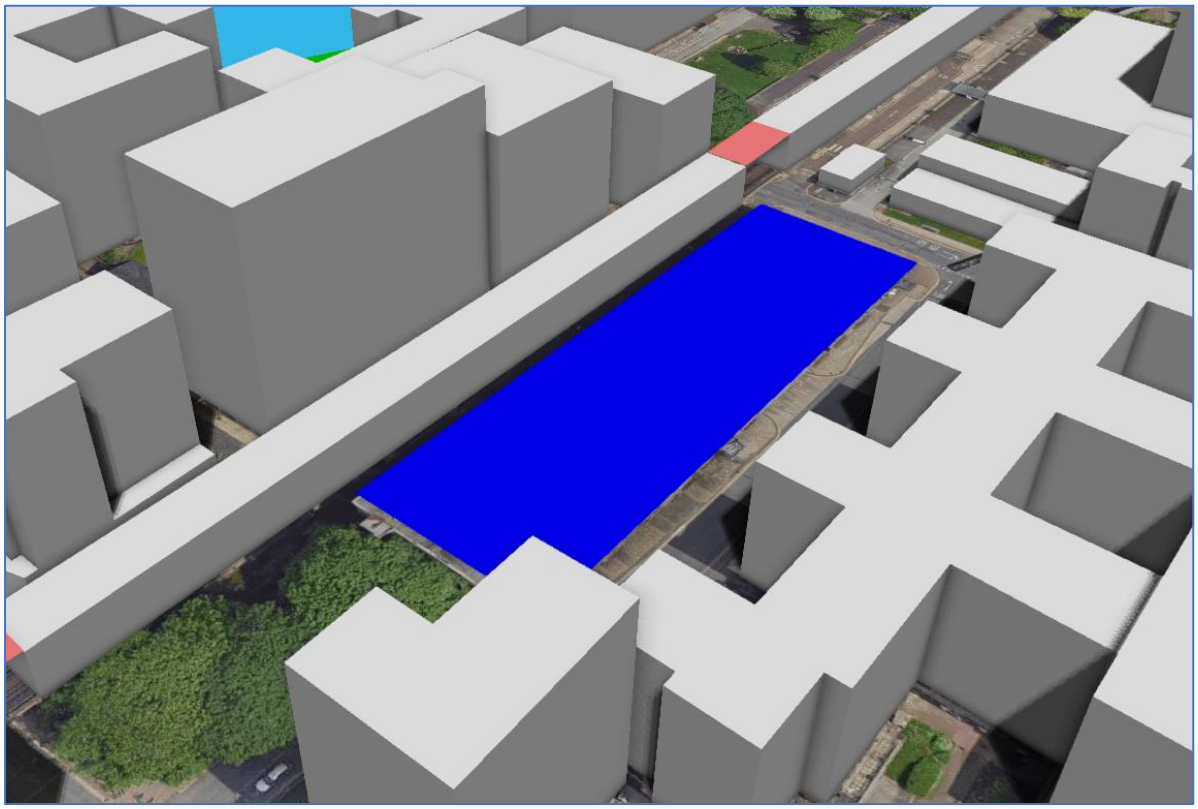
- **P3 – Superstructure:** A single area source was modelled over the entire site, at an average height of 20m above ground, representative of superstructure works on the lower floors where noise thresholds are most likely to be exceeded at nearby receptors. Predictions excluded the built form of the proposed development for a worst-case scenario.

- **P4 – Building Envelope:** Consistent with superstructure works, a single area source covered the entire site at a 20m height. This phase assumes construction on lower floors, presenting the highest potential impact. Built forms of the proposed development were similarly excluded to ensure a conservative assessment.

- **P5 – Fit-out:** Internal fit-out works, anticipated to follow the majority of external construction activities, are not expected to contribute significantly to noise emissions due to containment within the building envelope. Consequently, noise breakout during this phase is deemed negligible, and no further assessment was undertaken.

Figure 6 below illustrates a 3D screenshot of Phase 1 from the noise model, for information purposes.

Figure 6: Phase 1 3D Noise Modelling Screenshot



5.6. Noise Level Predictions

5.6.1. Private Residential Receptors

The predicted demolition noise levels at the worst-affected private residential receptors are summarised in Tables 8 – 15.

Table 8: Predicted Construction Noise Levels – 90 Princess Street

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	58	Weekday: 69 Saturday: 68	75	85
P2	63			
P3	65			
P4	59			

Table 9: Predicted Construction Noise Levels – Salisbury House

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	64	Weekday: 69 Saturday: 68	75	85
P2	70			
P3	71			
P4	65			

Table 10: Predicted Construction Noise Levels – Orient House

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	66	Weekday: 69 Saturday: 68	75	85
P2	71			
P3	73			
P4	67			

Table 11: Predicted Construction Noise Levels – Granby House

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	67	Weekday: 69 Saturday: 68	75	85
P2	72			
P3	73			
P4	67			

Table 12: Predicted Construction Noise Levels – Fairbairn Building

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	66	Weekday: 69 Saturday: 68	75	85
P2	72			
P3	73			
P4	67			

Table 13: Predicted Construction Noise Levels – 1 Samuel Ogden Street

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	54	Weekday: 69 Saturday: 68	75	85
P2	59			
P3	63			
P4	57			

Table 14: Predicted Construction Noise Levels – Granby Village

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	56	Weekday: 69 Saturday: 68	75	85
P2	61			
P3	66			
P4	60			

Table 15: Predicted Construction Noise Levels – Montana House

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	54	Weekday: 65 Saturday: 63	75	85
P2	60			
P3	64			
P4	58			

Based on the predicted noise levels presented in Tables 8 to 15, the following conclusions have been drawn for the most-exposed façade/window of the worst-affected private residential receptors:

90 Princess St (Table 8)

- Construction noise levels are predicted to remain below all thresholds throughout the works.

Salisbury House (Table 9)

- Construction noise levels are predicted to remain below the threshold for a significant adverse effect, except during phases P2 and P3, with the highest predicted noise level of 71 dBA.
- No exceedance of the noise insulation or temporary re-housing thresholds are anticipated.

Orient House (Table 10)

- Construction noise levels are predicted to remain below the threshold for a significant adverse effect, except during phases P2 and P3, with the highest predicted noise level of 73 dBA.
- No exceedance of the noise insulation or temporary re-housing thresholds are anticipated.

Granby House (Table 11)

- Construction noise levels are predicted to remain below the threshold for a significant adverse effect, except during phases P2 and P3, with the highest predicted noise level of 73 dBA.
- No exceedance of the noise insulation or temporary re-housing thresholds are anticipated.

Fairbairn Building (Table 12)

- Construction noise levels are predicted to remain below the threshold for a significant adverse effect, except during phases P2 and P3, with the highest predicted noise level of 73 dBA.
- No exceedance of the noise insulation or temporary re-housing thresholds are anticipated.

1 Samuel Ogden Street (Table 13)

- Construction noise levels are predicted to remain below all thresholds throughout the works.

Granby Village (Table 14)

- Construction noise levels are predicted to remain below all thresholds throughout the works.

Montana House (Table 15)

- Construction noise levels are predicted to remain below the threshold for a significant adverse effect, except during phase P3 (exceeding the Saturday limit only), with the highest predicted noise level of 64 dBA.
- No exceedance of the noise insulation or temporary re-housing thresholds are anticipated.

5.6.2. Hotel/PBSA Receptors

Predicted construction noise levels for the worst-affected Hotel and PBSA receptors to the site are provided in Tables 16 and 19.

Table 16: Predicted Construction Noise Levels – 121 Princess Street

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	48	Weekday: 69 Saturday: 68	75	85
P2	54			
P3	59			
P4	53			

Table 17: Predicted Construction Noise Levels – Pendulum Hotel and Weston Halls

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	69	Weekday: 65 Saturday: 64	75	85
P2	74			
P3	74			
P4	67			

Table 18: Predicted Construction Noise Levels – Ibis Hotel

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	67	Weekday: 65 Saturday: 63	75	85
P2	72			
P3	72			
P4	66			

Table 19: Predicted Construction Noise Levels – Vita Students

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	57	Weekday: 65 Saturday: 63	75	85
P2	63			
P3	63			
P4	57			

Based on the predicted noise levels presented in Tables 16 and 19, the following conclusions have been drawn for the most-exposed façade/window of the worst-affected hotel/PBSA receptors:

121 Princess Street (Table 16)

- Construction noise levels are predicted to remain below all thresholds throughout the works.

Pendulum Hotel and Weston Halls (Table 17)

- Construction noise levels are predicted to exceed the threshold for a significant adverse effect during all phases, with the highest predicted noise level of 74 dBA.
- No exceedance of the noise insulation or temporary re-housing thresholds are anticipated.

Ibis Hotel (Table 18)

- Construction noise levels are predicted to exceed the threshold for a significant adverse effect during all phases, with the highest predicted noise level of 72 dBA.
- No exceedance of the noise insulation or temporary re-housing thresholds are anticipated.

Vita Students (Table 19)

- Construction noise levels are predicted to remain below all thresholds throughout the works.

5.6.3. Educational/Research Receptors

Predicted construction noise levels for the worst-affected educational/research receptors to the site are provided in Table 20 – 23.

Table 20: Predicted Construction Noise Levels – Sackville Street Building

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	55	Weekday: 69 Saturday: 68	-	-
P2	60			
P3	62			
P4	56			

Table 21: Predicted Construction Noise Levels – James Lighthill Building

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	67	Weekday: 65 Saturday: 64	-	-
P2	72			
P3	71			
P4	65			

Table 22: Predicted Construction Noise Levels – Pariser Building

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	59	Weekday: 65 Saturday: 64	-	-
P2	65			
P3	65			
P4	59			

Table 23: Predicted Construction Noise Levels – Renold Building

Phase	Predicted Construction Noise Levels dB $L_{Aeq, T}$	Significant Effect Threshold dB $L_{Aeq, T}$	Noise Insulation Threshold dB $L_{Aeq, T}$	Temporary Re-Housing Threshold dB $L_{Aeq, T}$
P1	59	Weekday: 65 Saturday: 64	-	-
P2	65			
P3	67			
P4	61			

Based on the predicted noise levels presented in Tables 20 – 23, the following conclusions have been drawn for the most-exposed façade/window of the worst-affected educational/research receptors:

Sackville Street Building (Table 20)

- Construction noise levels are predicted to remain below the threshold for a significant adverse effect during all phases.

James Lighthill Building (Table 21)

- Construction noise levels are predicted to exceed the threshold for a significant adverse effect during all phases, with the highest predicted noise level of 72 dBA.

Pariser Building (Table 22)

- Construction noise levels are predicted to remain below the threshold for a significant adverse effect, except during phases P2 and P3 (exceeding the Saturday limit only), with the highest predicted noise level of 65 dBA.

Renold Building (Table 23)

- Construction noise levels are predicted to remain below the threshold for a significant adverse effect, except during phases P2 and P3, with the highest predicted noise level of 67 dBA.

5.6.4. Conclusion

The predictions indicate that construction noise levels are likely to exceed the significant adverse effect level during several phases of the works, particularly at the closest receptors to the south and north of the site. Whilst exceedances of the noise insulation or temporary re-housing thresholds are not expected, it is recommended that the contractor implements best practicable means for noise reduction and that works are conducted in the least disruptive manner. To manage the predicted impacts:

- Implement best practicable noise reduction measures.
- Maintain effective community liaison to keep affected occupants informed.
- Continuously monitor noise levels to ensure compliance with thresholds.

These measures will help minimise disruption and address any exceedances effectively. More detail has been provided in the following Section.

5.7. Recommended Noise Mitigation Measures

To justify the predicted noise emissions and ensure compliance during construction, it must be ensured that Best Practicable Means (BPM) are being used to limit noise emissions wherever possible.

Best Practicable Means (BPM) as defined in Section 72 of the Control of Pollution Act 1974, is a key regulatory concept in managing environmental impacts, particularly noise and vibration from demolition sites. BPM is not explicitly defined in terms of specific measures; instead, it emphasises the adoption of all reasonably practicable precautions, considering the current state of technical knowledge and the financial implications of applying various control techniques.

Summary of Best Practicable Means

- **Practicability:** This includes the suitability and feasibility of the noise and vibration control measures. It considers what is technically feasible with the available technology and methods.
- **Current Technical Knowledge:** BPM requires the use of the latest technology and methods that are proven to be effective in noise and vibration reduction.
- **Costs and Benefits:** The measures should be cost-effective, meaning the cost of implementing the measure is balanced against the benefit gained from the reduction in noise or vibration.
- **Nature of the Industry:** The specific characteristics and operational requirements of the construction industry are considered. This includes the type of work being carried out and the typical equipment used.

Site-Specific Best Practicable Means

The following table presents the list of BPM that must be considered and applied where possible in accordance with BS 5228.

Table 24: Best Practicable Means for Noise Reduction Applicable to the Proposed Works

BPM Measure	Applicability to the Works	Required to be Implemented on Site?
Use the quietest plant that it is feasible to do so for any given task.	This is applicable and shall be employed by the Contractor.	Yes
Use of modern, quieter machinery and technology as part of project planning and implementation.	The plant being used should be modern and up-to-date.	Yes
Avoid unnecessary revving of engines and switch off equipment when not required.	Applicable to all machinery/plant.	Yes
Maintain internal haul routes well to avoid noise from bumpy or uneven surfaces.	Applicable to primary routes on site used by machinery/plant.	Yes
Use rubber linings in chutes and dumpers to reduce impact noise.	Applicable to the dumper trucks.	Yes
Minimise the drop height of materials to reduce noise from impacts.	Applicable to the dumper trucks.	Yes
Start up plant and vehicles sequentially rather than all together to avoid peak noise levels.	Applicable to all of the main machinery/plant.	Yes
Orient noisy plant to direct noise away from sensitive areas.	Plant is mobile and not particularly directional and therefore this may not be applicable in this instance.	No
Use acoustic enclosures for noisy equipment.	Plant is mobile and therefore enclosures will not likely be feasible.	No
Apply sound-absorbing materials to the inner surfaces of enclosures.	Enclosures are not proposed as detailed above.	No
Manage the movement of plant on site concerning operational hours and proximity to noise-sensitive receptors	Primary mobile plant routes/haul roads should be through the centre of the site, rather than around the boundaries wherever possible.	Yes
Alternative reversing warning systems should be used instead of conventional audible alarms to minimise disturbance.	White noise reverse warning systems should be used wherever possible.	Yes
Maintenance of machinery should be regular and involve checks for potential noise increases which indicate maintenance needs.	All plant should be regularly checked and maintained.	Yes
Increase distance between the noise source and receptors to naturally reduce noise levels.	The plant will need to operate in set locations and therefore increasing distance to the receptors is not possible.	No
Use of noise barriers and screens to physically block sound paths to receptors.	Site hoarding is proposed around the site, which will reduce noise emissions where plant is used near the boundary.	Yes

Positioning of noise screens or barriers close to either the noise source or the receiver to maximise their effectiveness.	All plant is mobile and therefore positioning/moving screening closer to the plant will not be possible.	No
Site layout planning to use natural topography or existing structures to shield noise-sensitive areas.	Works are generally proposed to be carried out by maximising the use of existing structures for acoustic screening. In some instances, however, the works will inevitably have to be carried out in a direct line of sight with the receptors.	Yes
Vegetative barriers like trees or shrubs, although more psychological in their effect, can be used to give a perception of noise reduction.	There are no significant existing vegetative barriers and adding any in a short timeframe would not be possible.	No

In addition to these measures, BS 5228 provides details of community liaison and construction noise monitoring, as detailed in Sections 7 and 8 of this report.

The purpose of the scheme of construction noise monitoring will be to ensure construction works do not exceed the significant effect, as well as the noise insulation or temporary re-housing thresholds at the relevant receptors.

The noise insulation and temporary-rehousing thresholds only apply to residential receptors and after exceedance periods defined as 10 days within any 15 consecutive days, or 40 days within any consecutive 6-month period. If these thresholds are exceeded during these periods, appropriate measures, or reasonable costs thereof, must be offered to affected occupants. This may include the installation of secondary glazing, alternative ventilation in their properties, or temporary re-housing for the duration of the noisy works.

5.8. Construction Noise Significance

The predicted construction noise levels have the potential to cause significant adverse effects at the nearby noise sensitive receptors identified in the assessment. It is therefore recommended that BPM are employed to control noise emissions.

Further to the implementation of BPM, and the community liaison and monitoring measures detailed later in this report, the works are expected to align with BS 5228 and the principle of BPM and therefore offers of noise insulation or temporary re-housing are not likely to be required.

6. Construction Vibration Impact Assessment

6.1. Assessment Method

An assessment has been conducted to predict construction vibration emissions at the nearest noise-sensitive receptors in accordance with BS 5228-2:2009+A1:2014. The method comprises the following steps:

1. Identify appropriate vibration thresholds at which significant adverse effects may occur, and at which temporary/permanent rehousing may be necessary.
2. Identify suitable source vibration levels, based on the anticipated plant/machinery, by referencing the vibration level databases in either BS 5228 or the United States (US) Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Assessment Guide ("the FTA Guide").
3. Predict the construction vibration levels at the nearest noise sensitive receptors in accordance with BS 5228 or the FTA Guide.
4. Compare the predicted vibration levels against the vibration thresholds.
5. Determine whether mitigation measures are required to protect nearby receptors from construction vibration.
6. Conclude on the significance of the predicted vibration levels, accounting for the proposed mitigation measures.

6.2. Construction Vibration Thresholds

BS 5228 presents different vibration thresholds, exceedance of which triggers different responses. These are as follows:

1. **Significant Effect:** BS 5228 states that a peak particle velocity (PPV) vibration level greater than 1.0 mm/s is likely to cause complaint but can be tolerated in prior warning and explanation has been given to residents.
2. **Upper Limit:** BS 5228 states that a PPV of 10 mm/s is likely to be intolerable for any more than a very brief exposure to this level in most building environments. This is therefore deemed the upper threshold and should not be exceeded.

The applicable vibration thresholds have been selected in accordance with BS 5228 as presented below, with reference to any residential, PBSA or educational receptor buildings.

Table 25: Construction Vibration Thresholds

Receptor	Significant Effect Threshold PPV mm/s	Upper Limit Threshold PPV mm/s
Private residential, PBSA residences and educational buildings	1.0	10.0

The thresholds are based on human response and therefore the same had been applied to all receptors mentioned in this report.

In addition to the above, BS 5228 also indicates that light cosmetic damage to buildings is possible when vibration levels exceed 15 mm/s at receptor locations, particularly when the buildings are connected. Minor structural damage to residential buildings is typically only expected at levels above 30 mm/s.

Furthermore, a construction vibration threshold of 5 mm/s PPV has been adopted at the location of the elevated railway line to the north of the site, in accordance with Network Rail's requirements.

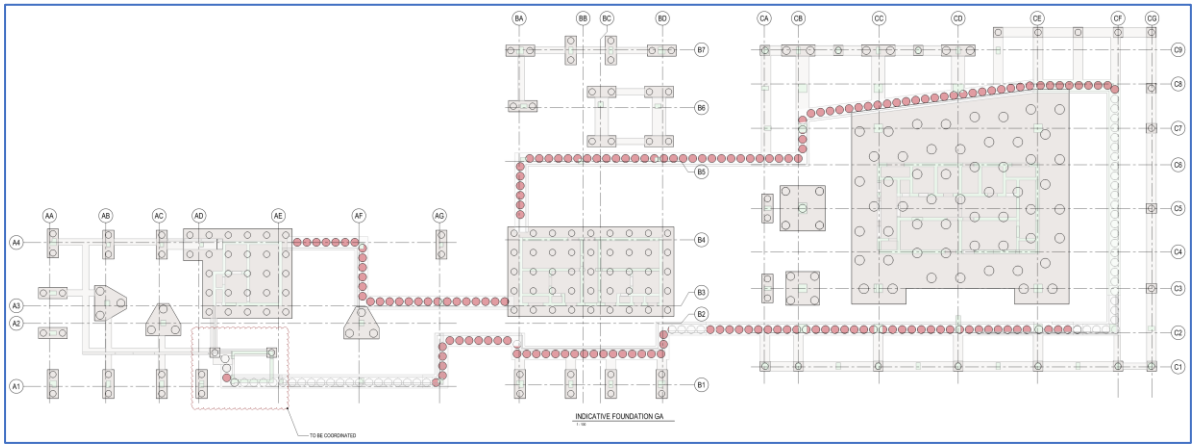
6.3. Prediction of Vibration Levels

6.3.1. Piling Works

Piling works will be required to provide foundations for the proposed development. It is understood that Continuous Flight Auger (CFA) piling will be employed, using a Soilmec SR-75 rig. CFA piling is widely recognised as one of the least intrusive piling techniques, generating low levels of ground-borne vibration and airborne noise, making it particularly suitable for sensitive or urban environments.

The indicative general arrangement (GA) of the proposed piling locations is illustrated in Figure 7 below.

Figure 7: Indicative Piling GA Layout



The nearest private residential receptor (Granby House, Fairbairn Building) as well as the nearest Hotel/PBSA residences (Pendulum Hotel/Weston Halls) are located approximately 15m from the closest piling location. In addition, the nearest sensitive structure of the adjoining elevated railway line, serving Oxford Road and Piccadilly Stations, is located approximately 7m from the nearest proposed piling locations.

Although detailed vibration prediction methods for CFA piling are limited, published data confirm that vibration magnitudes generated by this technique are generally very low and decay rapidly with distance. Reference has therefore been made to historical measurement data presented in BS 5228-2:2009+A1:2014, which includes representative vibration levels for comparable rotary bored and auger piling activities.

As rotary bored piling typically produces higher vibration levels than CFA piling, these data have been adopted as a conservative worst-case benchmark for this assessment. The most relevant data from BS 5228-2 are summarised in Table 26 below.

Table 26: BS 5228-2 Historic Piling Data

BS 5228 Ref.	Soil Conditions	Pile Dimensions	Mode	Distance	PPV (mm/s)
D.104	Fill/sand/clay	500mm diameter, unknown depth	Augering	10	0.4
			Auger hitting base of hole	14	0.3
			Mudding in	10	0.3
			Spinning off	10	0.3
D.105	Sand and gravels over chalk	600mm diameter, 12m depth	Augering	8	0.04
			Auger hitting base of hole	8	1.7
			Spinning off	8	0.06
D.106	6m of soft ground over rock	600mm diameter, 7m depth	Augering	5	0.54
			Surging casing	5	0.36
			Twisting in casing	5	0.22
			Spinning off	5	0.42
			Boring with rock auger	5	0.43
D.107	Fill including pockets of gravel over London clay	350 mm diameter, 7m depth	Augering	5.5	0.13

Based on the above data, it can be concluded that:

- At a distance of 15m, at the location of the nearest private residential receptors, PPV levels from the proposed CFA piling works are not expected to exceed 1mm/s, which is below the threshold for significant adverse effects and therefore considered acceptable. PPV levels at other private residential receptors located further away are expected to be even lower.
- Similarly, also at a distance of 15m, at the location of the nearest Hotel/PBSA residences, PPV levels from the proposed CFA piling works are not expected to exceed 1mm/s. This is also considered acceptable. PPV levels at any other Hotel/PBSA residences further away are expected to be lower still.
- At a distance of 7m, PPV levels are not expected to exceed Network Rail's structural vibration limit of 5mm/s PPV, indicating that the works are also expected to be acceptable with respect to the adjacent elevated railway structure.

6.3.2. Other Works

Table 27 summarises the key construction equipment expected to dominate vibration levels close to the site boundary. Equipment types, working locations, and activities are based on early-stage assumptions (see Appendix B). Source vibration levels for each plant item were taken from BS 5228-2 and the Federal Transit Administration (FTA) databases.

Table 27: Source Vibration Level for Proposed Plant

Equipment Type	Working location / activity	Database Reference	Source Vibration Level PPV mm/s
Vibratory Roller	Piling mat	FTA guide	5.3 at 7.6m
Lorry	Vehicle entrance and access/haul routes	FTA guide (Loaded Trucks)	1.9 at 7.6 m
Excavator	Across the majority of site	FTA guide	1.9 at 7.6 m

The construction vibration levels were predicted using the FTA guide methodology, which incorporates simple assumptions for soil damping and geometric dispersion. The results of these predictions are presented in Table 28. The shortest average working distance from the nearest site boundary to the location of the sensitive receptor/structure has been used.

Table 28: Predicted Construction Vibration Levels at the Nearest Receptors

Receptor	Distance	Predicted Construction Vibration Levels PPV mm/s			Significant Effect Threshold PPV mm/s	Temporary Re-Housing Threshold PPV mm/s
		Vibratory Roller	Lorry	Excavator		
Nearest private residential receptor	15	1.9	0.7	0.7	1.0	10.0
Nearest Hotel/PBSA residences	15	1.9	0.7	0.7	1.0	10.0
Nearest Educational/Research Receptor	16.5	1.7	0.6	0.6	1.0	-
Nearest elevated railway structure	7	6	2.2	2.2	5.0	-

Based on the above, it can be concluded that:

- PPV levels from the proposed use of construction machinery will generally stay below the threshold for significant effect, at locations of the nearest private residential receptors as well as the nearest Hotel/PBSA residences and educational/research receptors. However, where vibratory rollers are operating at the closest site boundaries, at a distance of 15m from the sensitive receptor buildings, vibration levels of up to 1.9mm/s PPV can be expected, exceeding the significant effect threshold.
- PPV levels from the proposed use of construction machinery will generally stay below Network Rail's threshold of 5mm/s at the location of the nearest elevated railway structure. However, similarly, where vibratory at the closest site boundaries, at a distance of 7m from the elevated railway structure, vibration

levels of up to 6mm/s PPV can be expected, marginally exceeding Network Rail's threshold.

6.3.3. Conclusion and Key Findings

With exception of the railway structure, the receptor points for vibration are located within the buildings where occupants would experience the vibration. However, the predictions are based on theoretical free-field receptors, which do not consider the effects of building structure. As the receptor buildings are predominantly large, heavyweight structures, it is likely that vibration levels will decrease as they transmit into the building interiors. These predictions, therefore, represent a conservative worst-case scenario.

Key Findings:

1. **Nearest Private Residential Receptors and Nearest Hotel/PBSA Residences (Pendulum Hotel, Weston Halls, Granby House, Fairbairn Building – approx. 15m):** Predicted vibration levels from CFA piling are expected to remain below 1 mm/s PPV, well under the threshold associated with the onset of significant adverse human response. While low-level vibration may be perceptible to occupants, it is not expected to cause disturbance or concern.

   Predicted vibration levels from vibratory roller operations, however, may exceed the 1 mm/s PPV threshold at the nearest façades, given the short separation distance of approximately 15m from the site boundary. Any such exceedances are expected to be temporary and tolerable, particularly if advance notification is provided to occupants. Where practicable, the use of alternative, lower-impact plant or equipment should be considered when operating close to sensitive receptors.

   All predicted vibration levels are significantly below the upper threshold of 10 mm/s for temporary re-housing and the levels at which cosmetic damage to structures is likely to occur. Thus, the risk of structural damage to buildings is negligible.

2. **Nearest Elevated Railway Structure:** Predicted vibration levels from CFA piling are anticipated to be well below the Network Rail limit of 5 mm/s PPV, indicating compliance with structural and operational vibration criteria.

   Vibration levels associated with vibratory roller operations may, however, may slightly exceed the 5 mm/s PPV criterion when operating at the closest working distance of around 7m. To ensure compliance, it is recommended that alternative, lower-impact plant or methods should be used when working in close proximity to the railway structure.

   Recommendations:

   - **Mitigation Measures:** Best Practicable Means (BPM) should be implemented to minimise vibration levels during construction works. Measures may include limiting the use of vibratory rollers near sensitive receptors/structures and optimising working practices to reduce vibration emissions.

- **Community Liaison:** Clear communication with nearby occupants and building users is recommended to provide advance notice of potential vibration levels during critical construction activities.
- **Vibration Monitoring:** Continuous vibration monitoring should be conducted to verify compliance with the predicted vibration levels and ensure adherence to the established thresholds.

By implementing these recommendations, the potential for significant adverse effects on sensitive receptors can be effectively mitigated while maintaining compliance with applicable standards.

6.4. Required Vibration Mitigation Measures

To justify the predicted vibration emissions and ensure compliance during construction, it must be ensured that Best Practicable Means (BPM) are being used to limit vibration emissions wherever possible.

The BPM principle for vibration is the same as it is for noise; vibration should be limited wherever practicable.

The following table presents the list of BPM that must be considered and applied where possible in accordance with BS 5228.

Table 29: Best Practicable Means for Vibration Reduction Applicable to the Proposed Works

BPM Measure	Applicability to the Works	Required to be Implemented on Site?
Use of modern methods which lower vibration emissions as part of project planning and implementation.	The plant being used should be modern and up-to-date. The construction methods are understood to be those with the lower vibration emissions, given the relevant constraints on access and programme.	Yes
Isolate vibration at source by installing equipment on anti-vibration mountings where necessary.	Not applicable to mobile plant.	No
Position vibrating equipment far from sensitive receptors, and not on the same structure as the receptor.	Plant must operate where required in this instance which includes the site boundaries.	No
Remove any known obstructions from the piling locations.	Applicable during piling works.	Yes
Mudding in for rotary bored piles. Seat the casing using a twister bar where possible as opposed to tapping or vibrating into position.	It is recommended to carry out piling works using CFA	No
Avoid sheer leg contact with sensitive structures which can	Not applicable.	No

transfer vibration directly to the receptor.		

In addition to the above measures, BS 5228 recommends community liaison and vibration level monitoring which are detailed further in Sections 7 and 8 of this report.

6.5. Construction Vibration Significance

The predicted construction vibration levels have the potential to cause significant adverse effects the nearest occupied sensitive receptors (Pendulum Hotel/Weston Halls, Granby House, Fairbairn Building) and may also exceed Network Rail's threshold at the adjoining elevated railway structure. It is therefore essential that BPM are employed to control and minimise vibration emissions.

Further to the implementation of BPM, and the community liaison and monitoring measures detailed later in this report, the works are expected to align with the BS 5228 guidelines and therefore offers of additional measures such as temporary re-housing are not likely to be required.

7. Community Liaison

Effective co-ordination and time management of construction works is essential in avoiding noise and vibration nuisance to surrounding uses. Early and helpful communications with the surrounding residents and building occupants will assist in reducing the potential for, and in managing, any complaints arising during construction.

Details of the proposed community liaison strategy are provided as follows:

1. **Communication with Nearby Building Occupants:** Contractors are required to ensure that sensitive receptors are kept informed about the activities. This includes providing advance notice of any works that may cause significant disruption due to noise or vibration.
2. **Site Contact Board:** A site contact board must be displayed prominently at the site entrance. This board should include:
    - The name of the main contractor.
    - The address and telephone number where a responsible person can be contacted.
    - The name of the site manager.
    - The expected month and year of completion of the works.
3. **Regular Updates:** The contractor should issue regular updates to affected receptors and other stakeholders about the progress of the work and any changes to the expected schedules or impacts.
4. **Handling Complaints:** A procedure must be in place for handling complaints from the public effectively. This includes recording complaints, actions taken in response, and ensuring timely communication back to the complainant.
5. **Staffed Telephone Line:** There should be a telephone line available at all times during working hours, which can be used by the public to make enquiries or complaints. This line should be manned by staff who are knowledgeable about the project and capable of addressing concerns.
6. **Newsletter:** Contractors are encouraged to issue newsletters, ideally monthly, to keep the local community informed about the project progress, upcoming activities, and other relevant information.

These community liaison requirements are designed to ensure transparency, maintain good relations with the local community, and address any concerns promptly during the construction period.

By implementing the above, the Contractor is demonstrating a commitment to BPM with regards to community liaison.

8. Noise and Vibration Monitoring Strategy

8.1. Strategy Overview

The following monitoring strategy has been developed and is considered appropriate for this project and in line with Manchester City Council's 2022 Noise and Planning Technical Guidance.

8.2. Monitoring Locations

It is recommended that continuous construction noise and vibration monitoring is carried out for the duration of the works at locations representative of the surrounding receptors.

As such, two noise monitors and two vibration monitors are recommended as a minimum, in this instance.

The proposed monitoring locations are shown in Figure 8 and described below.

Figure 8: Proposed Noise and Vibration Continuous Monitoring Positions



8.3. Noise and Vibration Limits

8.3.1. Noise Limits

Table 30 presents the applicable limits at the recommended noise monitoring locations. A 1-hour warning alert is recommended so that the Contractor can check methods and ensure that operations are not expected to exceed the noise limit for the full daytime working period.

Table 30: Construction Noise Limits and Alerts

Measurement Location	Noise Limit dB	
	Warning Alert $L_{Aeq,1hour}$	Noise Limit $L_{Aeq,T}$
Position 1 and 2	70	75

If the monitors are installed closer to the works than the receptors then higher limits may be applicable.

8.3.2. Vibration Limits

It should be ensured that vibration levels do not exceed a peak particle velocity (PPV) of 10 mm/s as an absolute worst-case. It is recommended that alerts are set to notify the Contractor when they are likely to exceed both 3 mm/s and 5 mm/s.

Table 31 presents the applicable limits at the recommended vibration monitoring location. The Contractor should stop works and inspect the operations being undertaken as soon as exceedances are recorded.

Table 31: Construction Vibration Limits and Alerts

Measurement Location	Vibration Limit PPV mm/s	
	Warning Alert	Vibration Limit
Position 1 and 2	3	5

As above, if the monitoring position is installed closer to the works than the receptor then higher limits may be applicable.

8.4. Monitoring Specifications

Both the noise and vibration monitors should be automatic remote logging systems, collecting noise and vibration data at regular intervals (e.g., every 15 minutes) throughout the monitoring period.

Data should be accessible in real-time and historically through a web-based platform. Noise alert and action levels shall be set up at the limits defined in the previous section. Should noise or vibration levels exceed these thresholds, emails shall be dispatched to a designated contact list.

A monthly monitoring report should be produced, summarising the measurement results from each location and comparing them against established baselines or limits.

Where the measured noise levels are more than the predicted noise levels or in the event of a complaint of noise an investigation shall be carried out to ascertain the cause of the exceedance or the complaint and to check that Best Practicable Means are being used to control the noise in accordance with the steps set out in this report. Noise levels shall be reduced further if it is reasonably practicable to do so.

A similar procedure should be applied to the vibration measurements.

The Contractor shall carry out these investigations and report back to the monitoring team to confirm the reason for exceedance, and the measures put in place to rectify the situation.

9. Construction Road Traffic Noise Increase Assessment

9.1. Overview and Methodology

This report section provides the details of the road traffic noise increase assessment used to inform the assessment of potential significant effects due to road traffic noise during the construction phase of the development.

The impact of any changes in road traffic noise levels have been assessed in accordance with the principles and guidance presented within the Highways Agency Design Manual for Roads and Bridges (DMRB).

The DMRB states that "*The impact of a road project at any location can be reported in terms of changes in absolute noise level. In the UK the standard index used for traffic noise is the $L_{A10,18hour}$ level, which is quoted in decibels*".

In order to determine whether changes in traffic noise levels are likely to occur during construction phase of the development, noise levels are predicted in accordance with the methodology contained within the Calculation of Road Traffic Noise (CRTN).

The calculation method uses a number of input variables to predict the $L_{A10,18hour}$ noise level for any receptor point at a given distance from the road. In this assessment, however, the key factors are changes in traffic flows and the composition of the traffic (i.e. percentage HGVs).

The existing and future road traffic flows have been provided by the transport consultants, allowing us to conduct a comprehensive assessment.

The potential road traffic noise increase associated with the proposed development has been calculated in accordance with the Basic Noise Level (BNL) prediction methodology detailed in CRTN. This methodology considers the relative change in noise level for a notional road-side receptor at a distance of 10m from the kerb and at a height of 1.5 m (free-field).

9.2. Criteria

The DMRB presents a significance matrix for assessing the magnitude of changes in noise level, which is reproduced in the table below and has been utilised in this assessment to consider the effect of any changes in road traffic noise levels. An increase in noise level represents an adverse effect whilst a reduction in noise represents a beneficial effect. The "magnitude of change" is detailed in Table 32 below, corresponding to a change in the short-term.

Table 32: Road Traffic Noise Increase Magnitude of Change – Short Term

Short Term Magnitude	Short Term Noise Change (dB $L_{A10,18hr}$ or L_{night})
Major	Greater than or equal to 5.0
Moderate	3.0 to 4.9
Minor	1.0 to 2.9
Negligible	less than 1.0

9.3. Calculated Road Traffic Flow Increases

9.3.1. Construction Phase

This section of the report presents the predicted potential road traffic noise increase during the construction phase at the nearest roads/links, based on the existing and future road traffic numbers, as provided by the transport consultants.

The outcome of the construction phase assessment is presented in Table 33 below.

Table 33: Road Traffic Increased During Construction Phase

Link and Location	Existing AAWT (All Vehicles)	Existing % HGVs	Future AAWT (All Vehicles)	Future % HGVs	Calculated Road Traffic Increase (BNL) dB	Significance in the short-term
Princess Street between Whitworth Street and Charles Street	3,722	37.7	3,852	35.9	+0.0	Negligible
Princess Street between Charles Street and Newman Street	3,722	37.7	3,736	37.7	+0.0	Negligible
Newman Street between Oxford Road and Princess Street	7,370	2.7	7,499	2.7	+0.1	Negligible
Princess St. south of Newman St.	9,072	2.9	9,125	3.0	+0.1	Negligible
Princess St. north of Whitworth St.	3,722	37.7	3,788	36.8	+0.0	Negligible
Mancunian Way between Cambridge Street and Brook Street	99,325	2.6	99,454	2.6	+0.0	Negligible
Oxford Road south of Charles Street	6,502	37.1	6,507	37.1	+0.0	Negligible
Charles Street west of Princess Street	2,464	9.0	2,520	8.8	+0.1	Negligible
Charles Street between Princess Street	2,464	9.0	2,574	10.5	+0.6	Negligible

and Sackville Street						
Sackville Street north of Charles Street	5,580	5.5	5,721	5.4	+0.1	Negligible
Sackville Street south of Charles Street	4,654	6.9	4,736	7.5	+0.2	Negligible

On this basis, construction traffic movements can be accommodated within the existing road network. The resulting change in traffic noise levels is predicted to be of negligible magnitude, consistent with DMRB LA 111 guidance, and as such are deemed to align with local and national noise policy aims.

10. Conclusion

Heyda Ltd was commissioned to undertake a Construction Noise and Vibration Assessment for the proposed redevelopment of Cambridge Halls, 41 Cavendish Street, Manchester (M15 6TT), on behalf of Unite Students and Manchester Metropolitan University (MMU). The scheme involves the demolition of the existing buildings and construction of new Purpose Built Student Accommodation (PBSA).

The assessment has defined appropriate construction noise and vibration thresholds in accordance with BS 5228-1 and BS 5228-2:2009+A1:2014, and evaluated potential impacts on the nearest sensitive receptors. Predicted levels are generally within acceptable limits, although short-term exceedances of the “significant effect” thresholds may occur at times due to the close proximity of nearby receptors.

Predicted changes in road traffic noise during the construction phase are below perceptible thresholds set out in DMRB LA 111, and therefore no significant noise impacts are anticipated from construction traffic.

Through the adoption of Best Practicable Means (BPM), including the use of modern, quieter plant, temporary acoustic screening, efficient site logistics, and the scheduling of higher-impact works within agreed working hours, potential disturbance can be reduced as far as reasonably practicable.

Implementation of the recommended mitigation and monitoring framework will ensure effective management of construction activities. Continuous or periodic noise and vibration monitoring, supported by real-time alert systems and responsive on-site controls, will maintain compliance with established limits.

In summary, the assessment confirms that, when undertaken in accordance with the recommended mitigation measures, monitoring protocols, and communication strategy, the construction works can be managed to minimise noise and vibration impacts and safeguard local amenity.

The commitment to transparent engagement, proactive management, and adherence to MCC Planning and Noise Technical Guidance (2022, §3.7.1.4) demonstrates that the

development will maintain a high standard of environmental performance and protect the well-being of the surrounding community throughout the construction process.

Appendix A - Glossary of Acoustic Terminology

This glossary provides an overview of key acoustic terms and concepts:

- Sound: Vibration of particles in a medium like air, detectable by the human ear. When sound is audible and unwanted or undesirable, it is termed 'noise'.
- Sound Pressure: Local pressure fluctuations from the normal pressure caused by the vibration or oscillation of particles. The number of oscillations per second is termed 'frequency'.
- Frequency: The rate at which particles oscillate, measured in Hertz (Hz). The human ear can typically detect frequencies from 20 Hz (low bass) to 20,000 Hz (high treble), with varying sensitivity across this range.
- Sound Pressure Level: Quantified in decibels (dB), this logarithmic parameter approximates the human ear's response to sound, measuring the ratio of a given pressure to the threshold of hearing.
- A-Weighted Decibels (dB(A) or dB L_{pA}): A frequency weighting used in sound level meters to mimic the human ear's response, particularly at typical environmental sound pressure levels.
- Measurement Parameters in Acoustics:
    - dB $L_{Aeq,T}$: Equivalent continuous A-weighted sound pressure level over a period, T, representing the energy-average sound pressure.
    - dB $L_{AFmax,T}$: Maximum A-weighted sound pressure level during a period, T, approximating the ear's time-response.
    - dB $L_{A90,T}$: The 90th percentile A-weighted sound pressure level, exceeded for 90% of the period, T, often referred to as the background sound level.
- Sound Level Meters: Instruments incorporating a microphone to measure sound pressure levels, using frequency filters to approximate the human ear's response.

Tables A1 and A2 in the appendix present sound pressure levels in typical environments and further definitions of acoustic parameters, respectively.

Table A1: Sound pressure levels within typical environments

Sound Pressure Level, dB	Typical Environment or Description
0	Threshold of hearing
15 to 25	A recording studio
25 to 35	A hotel bedroom at night
35 to 45	An unoccupied office
45 to 55	Quiet residential street
55 to 65	Normal conversation, 1 m away TV programme, listener position
65 to 75	Raised voices, 1 m away Urban high street traffic
75 to 85	Busy motorway traffic, on hard shoulder Typical small plant room
85 to 95	High-speed hand-dryer, operator position Inside London underground (average)
95 to 105	Pneumatic hammer, operator position Concert orchestra
105 to 115	Typical nightclub Untreated generator plantroom
115 to 140	Aircraft take-off, close proximity Threshold of pain

Table A2: Definitions of Acoustic Terminology and Parameters

Wording	Description
A-weighting	A process adjusting observed sound pressure levels across different frequencies to mimic the human ear's sensitivity to sound. Expressed as dB(A).
Ambient Sound Level	The total sound pressure level at a specific position from all surrounding noise sources, usually expressed as dB $L_{Aeq,T}$, the equivalent continuous A-weighted sound pressure level.
Best Practicable Means (BPM)	The most suitable mitigation techniques available that are practical and cost-effective for minimizing noise and vibration during construction.
BS 5228	British Standard for "Noise and Vibration Control on Construction and Open Sites," providing guidelines for assessing, managing, and mitigating noise and vibration on construction sites.
Decibel	A logarithmic unit measuring sound pressure or power relative to a reference value (20 µPa for sound pressure, 10^-12 W for sound power).
Equivalent Continuous Sound Pressure Level ($L_{Aeq,T}$)	A measure of the average sound level over a specified period, representing the energy mean of the sound pressure levels. Often used to describe exposure to noise.
Noise Insulation	Measures or methods used to reduce the transmission of sound from one area to another, usually involving structural modifications or the use of specific building materials.

Peak Particle Velocity (PPV)	A measure used in the assessment of vibration, indicating the maximum speed of a particle at a point, measured in mm/s, often used to assess potential damage to structures from vibration.
Receptor	Locations or individuals receiving or susceptible to environmental impacts like noise or vibration from a construction site.
Sound Absorption	The process by which material, structure, or object takes in sound energy when sound waves collide with it, as opposed to reflecting the sound.
Sound Power Level	The total sound energy emitted by a source per unit of time, measured in watts, and often converted to a decibel scale to describe the intensity of the source.
Sound Pressure Level (SPL)	The pressure level of sound relative to a reference value, measured in decibels (dB), used to describe the loudness at a specific location.
Substructure	The underlying structure forming the foundation of a construction project, involving initial phases like excavation and foundation laying, typically associated with higher vibration levels.
Thresholds	Pre-determined levels at which additional actions, such as mitigation or compensation, are required to manage the impact of construction noise or vibration.
Vibration Mitigation	Techniques or measures implemented to reduce the intensity and effects of vibration caused by construction activities, aimed at protecting structures and occupants from discomfort or damage.

Appendix B - Construction Plant Details

Table B.1: Schedule of Proposed Construction Plant – P1

Plant/Machinery/Activity	Reference (BS 5228 or Makita database)	Sound Power Level (dBA)	Quantity on site	Percentage on-time during a typical day (%)
Tracked Excavator	C.2.14	107	2	50
Vibratory roller	D.3.115	102	2	50
Lorry	D.7.121	98	2	15
Dumper	D.7.81	96	2	15

Table B.2: Schedule of Proposed Construction Plant – P2

Plant/Machinery/Activity	Reference (BS 5228 or Makita database)	Sound Power Level (dBA)	Quantity on site	Percentage on-time during a typical day (%)
Tracked Excavator	C.2.14	107	2	50
High-reach concrete pumps / placing booms	C.4.37	93	2	95
Concrete mixer truck and pump	C.4.28	103	4	15
Lorry	D.7.121	98	2	15
Muck/dumper + muckaway trucks (rotating fleet)	D.7.81	96	3	75
Piling Rig	C.3.21	107	2	90
Telehandler	D.3.6	107	2	65
Muckaway	D.7.81	96	3	75

Table B.3: Schedule of Proposed Construction Plant – P3

Plant/Machinery/Activity	Reference (BS 5228 or Makita database)	Sound Power Level (dBA)	Quantity on site	Percentage on-time during a typical day (%)
Scaffold frames and clips	D.7.3	100	2	5
Scaffold poles and clips	D.7.2	96	2	5
Hand-held hammer	D.7.80	107	4	5
Compressor	D.6.19	100	2	50
Electric percussion drill	D.6.53	104	4	10
Poker vibrator	D.6.20	102	2	30
Power float	D.6.44	100	2	30
Concretemixer truck, pump and boom arm	C.4.32	107	2	95
Tower crane	C4.48	104	2	95
Telehandler	D.3.6	107	2	60

Impact driver	Example Makita BTD147	106	4	5
Personnel & materials hoists (goods + passenger)	C.4.61	96	3	80

Table B.4: Schedule of Proposed Construction Plant – P4

Plant/Machinery/Activity	Reference (BS 5228 or Makita database)	Sound Power Level (dBA)	Quantity on site	Percentage on-time during a typical day (%)
Electric percussion drill	D.6.53	104	4	10
Hand-held hammer	D.7.80	107	2	5
Impact driver	Example Makita BTD147	106	2	5
Lifting platform	C.4.57	96	4	20
Material hoist	C.4.61	96	2	80
Tower crane	C4.48	104	2	65
Lorry	D.7.121	98	2	15
Façade Trailers offloading HIAB's	C.4.46	95	2	40