



**E3P**  
Taylor Road  
Trafford Park  
Urmston  
Manchester  
M41 7JQ

Manchester | London | Edinburgh

info@E3P.co.uk  
[www.E3P.co.uk](http://www.E3P.co.uk)

Ref: 50-780-R2-11  
Date: 30th June 2023

Adam Whalley  
**BOWSALL DEVELOPMENTS**  
Bowsall House  
3 King Street  
Salford  
M3 7DG

By Email

**Dear Adam**

## **CONSTRUCTION NOISE AND VIBRATION TECHNICAL NOTE 4B ALBANY ROAD, CHORLTON**

### **1. BACKGROUND & OBJECTIVES**

E3P have been commissioned to produce a technical note that considers the potential impact of construction noise and vibration associated with the permitted development on nearby sensitive receptors. E3P understand that concerns have been raised by an existing business in the vicinity of the site in relation to construction works. The concerns were raised via an objection to Manchester City Council and we are informed that the business is very noise sensitive and there are concerns in particular around the construction phase of development on this business being able to operate and function during construction activities. It is also understood that recent exploratory works on the application site caused disturbance and disruption to the business.

Accordingly, this technical note looks to consider the potential for noise and vibration impact upon the business and to advise on mitigation measures to be implemented. It is understood that the sensitive business noted is Airtight Studios to the immediate south of the site, approximately 15 m from the site boundary.

The technical note has been completed by Lee Faulkner, Associate Director at E3P, with over 12 years' experience in the measurement and assessment of noise and vibration. I hold the Post Graduate Diploma in Acoustics and Noise Control and I am a full corporate member of the Institute of Acoustics (MIOA).



## 2. GUIDANCE

### 2.1. BRITISH STANDARD 5228: NOISE AND VIBRATION CONTROL ON CONSTRUCTION AND OPEN SITES – PART 1: NOISE: 2009+A1 2014 (BS 5228-1)

This British Standard sets out techniques required to predict and assess the likely noise effects from construction works, based on detailed information on the type and number of plant being used, their location, and the length of time they are in operation.

The noise prediction method is used to establish likely noise levels in terms of the  $L_{Aeq,T}$  over the core working day.

This British Standard also documents a database of information, comprising previously measured sound power levels for a variety of different construction plant undertaking various common activities.

Example criteria are presented for the assessment of the significance of noise effects. Such criteria maybe concerned with fixed noise limits and/or ambient noise level changes. In addition to this, another method, the ABC method is given based on the existing ambient noise levels at the receptors.

### 2.2. BS 5228-1: 2009+A1:2014 'CODE OF PRACTICE FOR NOISE AND VIBRATION CONTROL ON CONSTRUCTION AND OPEN SITES – PART 2: VIBRATION'

This standard provides recommendations for basic methods of vibration control relating to construction and open sites. The legislative background to vibration control is described and guidance is provided concerning methods of measuring vibration and assessing its effects on the environment.

Guidance criteria are suggested for the assessment of the significance of vibration effects, such criteria are provided in terms of Peak Particle Velocities (PPV) and are concerned with both human and structural responses to vibration. Those applicable to human perception and disturbance are presented within Table 2.1.

TABLE 2.1: PPV CRITERIA – HUMAN EXPOSURE

| VIBRATION LEVEL | EFFECT                                                                                                                                                                                          |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0.14 mm/s       | Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration. |
| 0.3 mm/s        | Vibration might be just perceptible in residential environments                                                                                                                                 |
| 1.0 mm/s        | It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.                   |
| 10 mm/s         | Vibration is likely to be intolerable for any more than a very brief exposure to this level.                                                                                                    |

The Standard goes on to present guidance criteria applicable to the vibration response limits of buildings in terms of the component PPV, these are presented within Table 2.2.



TABLE 2.2: PPV CRITERIA – BUILDINGS

| TYPE OF BUILDING                                                                                     | PEAK COMPONENT PARTICLE VELOCITY IN FREQUENCY RANGE OF PREDOMINANT PULSE |                                                          |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------|
|                                                                                                      | 4 Hz to 15 Hz                                                            | 15Hz and above                                           |
| <b>Reinforced or framed structures<br/>Industrial and heavy<br/>commercial buildings</b>             | 50mm/s at 4Hz and above                                                  | 50mm/s at 4Hz and above                                  |
| <b>Unreinforced or light framed<br/>structures<br/>Residential or light commercial<br/>buildings</b> | 15mm/s at 4Hz increasing to<br>20mm/s at 15Hz                            | 20mm/s at 15Hz increasing to<br>50mm/s at 40Hz and above |

Note 1: Values referred to are at base of the building

Note 2: At frequencies below 4Hz, a maximum displacement of 0.6mm (zero to peak) is not to be exceeded.

It should be noted that the values presented within the Table are applicable to cosmetic damage only. It is stated within BS 5228-2 that minor damage is possible at vibration magnitudes which are greater than twice those given in the Table. The guide values for building damage are an order of magnitude higher than for human disturbance.



### 3. POTENTIAL SOURCES OF NOISE

As pad foundations are proposed, see section 4.0, piling is not considered here. As such, E3P have considered typical construction noise levels from typical plant likely to be used on site for the construction of a high rise residential development.

Table 3.1 below details typical construction plant that would be used.

TABLE 3.1: TYPICAL VIBRATION LEVELS

| PLANT TYPE                      | SOUND PRESSURE<br>LEVEL AT 10 m, $L_{Aeq,T}$<br>(dB) | NO. OF PLANT | ASSUMED % ON-TIME |
|---------------------------------|------------------------------------------------------|--------------|-------------------|
| Cement mixer truck<br>idling    | 71.0                                                 | 1            | 60                |
| Concrete pump +<br>cement mixer | 67.0                                                 | 2            | 80                |
| Tower crane                     | 76.0                                                 | 1            | 40                |
| Telescopic handler              | 79.0                                                 | 2            | 50                |
| Circular saw                    | 85.0                                                 | 1            | 40                |
| Diesel generator                | 77.9                                                 | 1            | 100               |
| Tracked excavator               | 88.0                                                 | 1            | 60                |

An average distance of 35 m from the centre of the site to the closest façade of the receptor is used based on the above information. As such, a calculated construction noise level is derived. Using this information a level of up to 68 dB is expected at the receptor.

This level of noise would fall below the 70 dB criterion set for rural areas as stipulated in BS 5228.

However, the receptor in question is not a residential receptor and requires low levels of noise to operate internally. Although the levels are higher than existing, this is to be expected with a construction site. However, in order to minimise any potential adverse impact, Best Practicable Means are recommended and detailed in Section 5.0.



## 4. POTENTIAL SOURCES OF VIBRATION

E3P understand that operations at the site will involve the construction of a residential block and E3P are in receipt of the Phase II Site Appraisal, conducted by Patrick Parsons, which considers the existing ground conditions and suitable foundations. The below is taken from section 11.3 Foundations:

*Based on development proposals it is considered that a traditional pad foundation solution may be feasible providing abnormally high loadings are not anticipated. An allowable bearing pressure of 125kN/m<sup>2</sup> should be achievable within the underlying medium dense/firm superficial soils with settlements not exceeding 25mm. Foundations should be deepened to extend through any Made Ground, soft or loose superficial soils to at least 200mm into minimum medium dense or firm natural soils.*

E3P note that pad foundations would not result in significant vibration levels in excess of those produced by typical construction activities. As such, consideration to construction of the foundations is not needed and E3P will consider the potential vibration impact of typical construction activities associated with road construction and plant movement.

E3P have used vibration data for typical construction activities within BS 5228 Part 2.

TABLE 4.1: TYPICAL VIBRATION LEVELS

| OPERATION                        | CONFIDENCE LIMIT | DISTANCE<br>(m) | PPV<br>(mm/s) |
|----------------------------------|------------------|-----------------|---------------|
| Vibratory rollers – start & end  | 95               | 60              | 0.3           |
|                                  | 95               | 23              | 1.0           |
| Vibratory rollers – steady state | 95               | 3.3             | 10            |
| HGVs                             | N/A              | 50              | ≤0.3          |
|                                  | N/A              | 17              | ≤1.0          |
|                                  | N/A              | 2.5             | ≤10.0         |

It should be noted that the data presented within the above table is general in nature and is not specific to the Site, however the vibration levels and associated distances can be used to determine the typical distances at which specific impacts are likely to be registered.

The closest point of the site to the closest noise and vibration sensitive receptor is noted to be 16 m, therefore the most applicable expected vibration levels are 1.0 mm/s for vibratory rollers and 1.0 mm/s for HGVs.

Therefore, given that the criteria for cosmetic damage for unreinforced lightweight structures is 15 mm/s and that the receptor is double the distance away, it is expected that levels of vibration from on-site operations are highly unlikely to cause any potential cosmetic damage to the existing receptors even when considering the highest likely vibration levels. Furthermore, the expected vibration levels would be no more than 1 mm/s for very short periods and ongoing levels are likely to be less than 1 mm/s consistently.

BS 5228 provides the following advice for the worst-case levels:

*It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.*



For the vast majority of periods, the following would be applicable:

*Vibration might be just perceptible in residential environments.*

The closest receptor is not residential in nature but is considered as sensitive. Therefore, it is recommended that prior warning is given. However, the impact of vibration at the receptor is considered low.



## 5. MITIGATION MEASURES

To reduce noise levels at the receptors, it is assumed that Best Practicable Means (BPM) will be followed on-site considering the proximity of existing and proposed residential receptors.

Accepted safeguards exist to minimise the effects of construction noise, these include:

- ✿ The various EC Directives and UK Statutory Instruments that limit noise emissions from a variety of construction plant.
- ✿ Guidance set out in BS5228-1 which covers noise control on construction sites; and
- ✿ The powers that exist for local authorities under Sections 60 and 61 of the Control of Pollution Act 1974 to control noise from construction application sites.

The adoption of Best Practicable Means, as defined in Section 72 of the Control of Pollution Act 1974 is usually the most effective means of controlling noise from construction sites. Such measures where appropriate may include the following:

- ✿ Any compressors brought on to the Site to be silenced or sound reduced models fitted with acoustic enclosures.
- ✿ All pneumatic tools to be fitted with silencers or mufflers.
- ✿ Care to be taken when erecting or striking scaffolds to avoid impact noise from banging steel. All operatives undertaking such activities to be instructed on the importance of handling the scaffolds to reduce noise to a minimum.
- ✿ Most deliveries to be programmed to arrive during normal working hours only. Care to be taken when unloading vehicles to minimise noise. Delivery vehicles to be routed to minimise disturbance to residents. Delivery vehicles to be prohibited from waiting within or in the vicinity of the Site with their engines running.
- ✿ All plant items to be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive noise.
- ✿ All plant to be sited so that the noise impact at nearby noise sensitive properties is minimised.
- ✿ Local hoarding, screens, or barriers to be erected as necessary to shield particularly noisy activities; and
- ✿ Problems concerning noise from construction works can often be avoided by taking a considerate and neighbourly approach to relations with the residents. Works should only take place during given periods, e.g. during normal construction hours and not at night.

It is recommended that the above measures be included in a Construction Environmental Management Plan (CEMP) to be secured through an appropriately worded planning condition that may be issued to and agreed with the contractor(s) conducting the works.

Experience from other sites has shown that by implementing the above measures, typical noise levels from construction works can be reduced by up to 10 dB. This will reduce noise at the receptor to approximately 58 dB. This level of noise is considered acceptable and the sound insulation performance of the façade is likely to control noise levels to less than 38 dB, bringing levels close to those found in a typical living room.



I trust the report is clear and concise but please do not hesitate to contact me should you require further information.

Yours sincerely,  
For and on behalf of E3P Ltd

Lee Faulkner  
**Associate Director**

