

Project

Pol 05 – External Plant Noise Assessment

Prepared for

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PI	19/05/2023	Initial issue	Joe Bear BEng (Hons) MIOA

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Summary

SRL Technical Services Limited have been appointed by Bowmer and Kirkland to do a noise survey and assessment of the newly installed building services plant at the Angel Square NOMA site in Manchester. The Local Authority for this development is Manchester City Council and the planning approval for the development included a limit for noise from plant and services. The purpose of this assessment is to determine whether the one BREEAM credit available under Pol05 can be awarded and the planning condition can be discharged.

During the survey, it was noted that the noise from the newly installed plant was not audible at the noise sensitive receptors around the site, and calculations indicate that the rating level of the plant is more than 5 dB below the background noise level when assessed in accordance with BS4142.

The BREEAM credit for Pol05 can therefore be awarded. This assessment also shows that noise levels comply with the limits set in the planning approval for the development.

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1.0 Introduction

SRL Technical Services have been appointed by Bowmer and Kirkland to measure noise from the newly installed plant at their new office in Angel Square NOMA, Manchester. The Local Authority for this development is Manchester City Council and the planning approval for the development included a limit for noise from plant and services. The purpose of this assessment is to determine whether the one BREEAM credit available under Pol05 can be awarded and the planning condition can be discharged.

We measured noise levels on the 16th May 2023 and the results were assessed.

2.0 Noise Criteria

2.1 Pol 05 Reduction of Noise Pollution

BREEAM UK New Construction Technical Manual SD5078 (2018) states that one credit may be awarded for controlling the noise emissions of building services at nearby noise sensitive receptors (NSRs).

The relevant criterion that applies for this development is Criterion 4 which states:

‘The noise level from the assessed building, as measured by the locality of the nearest or most exposed noise – sensitive development, must be at least 5dB lower than the background noise throughout the day and night.’

This criterion is also the same as the Local Authority’s as found in Planning Condition 16 from Manchester City Council:

‘Prior to the first use of the development hereby approved, details of any externally mounted ancillary plant, equipment and servicing shall be submitted for approval. For the avoidance of doubt, externally mounted plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5 dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location.’

To assess the noise emissions from the plant, the methodology set out in BS 4142:2014 have been used. This is described below.

2.2 BS 4142: Methods for Rating and Assessing Industrial and Commercial Sound (2014)

To determine whether the BREEAM criteria can be achieved, BREEAM states that a BS 4142 assessment of the installed plant must be done.

BS 4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ provides a method to assess whether “sound of an industrial and/or commercial nature” is likely to have an adverse impact at noise-sensitive receptors.

BS 4142’s assessment methodology considers how loud the noise is and its character (e.g. whether it contains hisses, bangs, or clicks). The assessment is then based on how loud (and how annoying) the source noise is compared with the existing background noise at the receptor.

The following corrections can potentially be applied for the acoustic character:

Impulsivity – a correction of up to +9 dB can be applied depending on how impulsive the specific noise is:

- +3 dB if the impulsivity is just perceptible at the receptor
- +6 dB if the impulsivity is clearly perceptible at the receptor, and
- +9 dB if the impulsivity is highly perceptible at the receptor

Tonality – a correction of up to +6 dB can be applied depending on how tonal the specific noise is:

- +2 dB for a tone which is just perceptible at the receptor
- +4 dB for a tone which is clearly perceptible at the receptor, and
- +6 dB for a tone which is highly perceptible at the receptor

If the source is both tonal and impulsive it is usual to only apply the correction for the characteristic which is most dominant.

Intermittency – when the noise source has identifiable on/off conditions (e.g. an item of plant which switches on and off), and these on/off conditions are clearly distinguishable against the acoustic environment, a correction of up to +3 dB can be applied.

Other sound characteristics – where the noise source is not tonal or impulsive but has another characteristic that is clearly distinguishable against the acoustic environment, a correction of up to +3 dB can be applied.

The Rating Level is determined by applying acoustic corrections to the Specific Noise Level, and then the Rating Level is compared with the measured background level. The difference between the Rating Level and the typical background level can then be interpreted using the following guidance from BS 4142, depending on the context:

- If the Rating Level is +10 dB or more above the background level, this indicates a significant adverse impact.
- A difference of around +5 dB is likely to be an indication of an adverse impact.

Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.3 Plant Noise Limits

Buro Happold set out external plant noise limits in their report 'NP4-BHE-04-XX-RP-Y-0004-P02' dated 4 February 2022 in Section 6.4, Table 6. These limits have been reproduced in Table 1.

Table 1: Bruro Happold Plant Noise Limits

NSR	Lowest measured Daytime Background Noise Levels ($\text{dBL}_{\text{A90, 15min}}$)	Plant daytime noise limit at 1 metre from NSR facades ($\text{dBL}_{\text{Ar,Tr}}$)	Lowest measured Night-time Background Noise Levels ($\text{dBL}_{\text{A90, 15min}}$)	Plant night-time noise limit at 1 metre from NSR facades ($\text{dBL}_{\text{Ar,Tr}}$)
All	56	51	46*	41*

**Please note that this assessment does not consider night-time levels as the plant will only operate in the daytime hours.*

In our assessment, I noticed that Buro Happold have used the lowest background noise levels instead of typical background noise levels. While this is strictly not correct, I have used these levels on basis that if the noise from the installed plant meets these limits, then it will be considered a “worst-case” assessment.

3.0 Noise Survey

In order to assess whether the criteria can be achieved, a noise survey at the nearby noise sensitive receptors was completed between 12:00 and 16:00 Tuesday 16th May 2023. Noise measurement locations and receptors are shown in Figure 1.

Figure 1: Noise measurement locations and nearby noise sensitive receptors



The microphone of the sound level meter at all positions was set at a height of 1.4m above ground level and in free-field conditions.

The survey noted that the dominant noise source throughout was road traffic on Corporation Street, with background noise levels being caused by distant road traffic. Maximum noise levels were due to HGV passes.

We could not hear noise from plant and services at either receptor location, so we measured noise levels close to the sources of plant noise to calculate the levels at the receptor locations.

Table 2: Description of Measurement Locations

Measurement Location	Location Description
1	1m away from the façade of Parkers Hotel Apartments and approximately 2m from the road edge of Corporation Street.
2	1m from Ashton House and approximately 3m from the road edge of Corporation Street.

Measurements were also taken at the external mechanical services plant louvres on the Northern and Western facades of the building, as well as near to the roof top plant. All plant was measured at a distance of 1m from the plant noise source. The measurements were short so that the measured noise levels were due to the plant rather than other noise sources.

Table 3 shows the measured noise levels during the noise survey.

Table 3: Measured Noise Levels

Measurement Location	Start Time (hh:mm)	Duration (mm:ss)	Ambient Noise Level (dBL _{Aeq,T})	Background Noise Level (dBL _{A90,T})	Maximum Noise Level (dBL _{AFMax})
1	14:19	15:00	69	59	87
2	14:35	15:00	68	58	86
1	14:57	15:00	68	57	88
2	15:39	15:00	67	59	85
Plant Noise from North Louvre	14:52	01:13	54	52	57
Plant Noise from West Louvre	14:54	01:27	56	53	60
Rooftop plant	12:21	01:59	66	63	79

Full survey details are presented in Appendix A.

4.0 Plant Noise Assessment

A BS 4142 assessment has been done to determine the impact of the newly installed plant to the noise sensitive receptors. In my assessment, I have applied a distance correction to the Specific Noise Level, however, no further corrections have been applied. It is likely that there would be additional attenuation in the noise levels due to screening and angle of view.

The plan operates from 09:00 – 17:00 and so only a daytime assessment is necessary.

Table 4: BS 4142 Assessment of Operating Plant – Daytime

	NSR 1 – Parkers Hotel Apartments	NSR 2 – Ashton House
Background Noise Level, (dB $L_{A90,T}$)	56	
Rating level limit (dB $L_{A,r,T,r}$)	51	
Calculated Specific Noise Level, (dB $L_{Aeq,T}$)	<46 ¹	<46 ¹
Acoustic Feature Corrections	0 ²	0 ²
Difference below background (dB)	>10	>10

1: The plant noise levels are likely to be lower than this at the receptor location, but cannot be reliably measured/calculated

2: Plant is not audible at either noise sensitive receptor, therefore no acoustic feature corrections are required

Our assessment shows that the rating noise levels of noise from the plant assessed is at least 11 dB below the lowest background noise level at the noise sensitive receptors, and potentially much lower.

The survey observations were also that the operating plant was not audible at either of the noise sensitive receptors and that road traffic, particularly from Corporation Street dominates the environment.

The operating plant therefore meets the criteria of Manchester City Council's Planning Condition 16. This Planning Condition can therefore be discharged.

As the operating plant meets the Local Authority's requirements, the BREEM Pol 05 credit can therefore be awarded.

Appendix A - Survey Details

A1. Location of Survey

Angel Square, Manchester M4 4DY

A2. Date & Time of Survey

12:00 – 15:00 Tuesday 16th May 2023

A3. Personnel Present During Survey

Matt Jones of SRL Technical Services

A4. Weather Conditions during Survey

Clear and dry. Little/no wind.

A5. Instrumentation

Bruel & Kjaer - Noise Meter AT2

Description	SRL No.	Make	Type	S/N
Sound Level Meter (AT2, Green)	814	Brüel & Kjaer	2250	2575775
Pre-amp	814	Brüel & Kjaer	ZC0032	5843
Microphone	814	Brüel & Kjaer	4189	2573767
Calibrator	815	Brüel & Kjaer	4231	2575525

A6. Calibration Procedure

Before and after the survey the measurement apparatus was check calibrated to an accuracy of ± 0.3 dB using the type 4231 Sound Level Calibrator. The Calibrator produces a sound pressure level of 93.8 dB re 2×10^{-5} Pa at a frequency of 1 kHz.

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