



Project

Pol 05 – Substation Noise Assessment

Prepared for

Bowmer & Kirkland
North West Regional Office
1st Floor
Altitude
Atlas Business Park
Manchester
M22 5PR

Published

19 May 2023



Telephone +44(0)1787 247595
Website www.srltsl.com
London, Birmingham, Manchester, Sudbury

Quality Assurance	
Project Title:	NOMA 4AS
Report Title:	Pol 05 – Substation Noise Assessment
Report Number:	81408-SRL-RP-YA-003-S2-PI
Client:	Bowmer & Kirkland
Client Address:	North West Regional Office, 1st Floor, Altitude Atlas Business Park, Manchester, M22 5PR
Author:	Matt Jones MEng (Hons) MIOA
Additional information:	

Version History

Version	Date	Comments	Approved by
PI	19/05/2023	Initial issue	Joe Bear BEng (Hons) MIOA

Matt Jones

For and on behalf of
SRL Technical Services Limited
Tel: 01787 247595
Email: mjones@srltsl.com



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 the substation. 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.



Contents

Summary..... 3

Contents..... 4

Appendix A - Survey Details 12

1.0 Introduction

SRL Technical Services have been appointed by Bowmer and Kirkland to measure noise from the newly constructed substation 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 9a 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.'

The approved scheme shall be implemented and prior to the first use of the development, a verification report will be required to validate that the work undertaken conforms to the recommendations and requirements approved as part of this planning condition. The verification report shall include post completion testing to confirm that the noise criteria has been met. In instances of non conformity, these shall be detailed along with mitigation measures required to ensure compliance with the noise criteria. Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority, and thereafter retained and maintained in situ.'

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

Commented [JB1]: Please include full condition

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 Substation 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 I.

Table I: Buro Happold Plant Noise Limits

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

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.

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.

We also measured noise levels 1m from louvred substation door. 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 Substation	12:12	01:32	58	58	60

Full survey details are presented in Appendix A.

4.0 Substation 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	
Specific Noise Level, (dB L _{Aeq,T})	<36 ¹	<36 ¹
Acoustic Feature Corrections	0 ²	0 ²
Difference (dB)	>20	>20

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

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

Our assessment shows that the predicted rating noise levels for all plant associated assessed more than 20 dB below the lowest background noise level at the noise sensitive receptors during the daytime.

Commented [JB2]: I think you should keep it simple and delete this and just have the night time assessment

Table 5: BS 4142 Assessment of Operating Plant – Night-time

	NSR 1 – Parkers Hotel Apartments	NSR 2 – Ashton House
Background Noise Level, (dB L _{A90,T})	46	
Rating level limit (dB L _{A,r,T,r})	41	
Specific Noise Level, (dB L _{Aeq,T})	<36 ¹	<36 ¹
Acoustic Feature Corrections	0 ²	0 ²
Difference (dB)	>10	>10

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

At night, our assessment shows that the predicted rating noise levels for all plant associated assessed more than 10 dB below the lowest background noise level at the noise sensitive receptors. The Planning Condition can therefore be discharged and the BREEM Pol 05 credit can therefore be awarded.

Appendix A - Survey Details

Location of Survey
 Angel Square, Manchester M4 4DY

Date & Time of Survey
 12:00 – 15:00 Tuesday 16th May 2023

Personnel Present During Survey
 Matt Jones of SRL Technical Services

Weather Conditions during Survey
 Clear and dry. Little/no wind.

Instrumentation

Brüel & 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

Commented [JB3]: I haven't checked this, so please make sure it's right

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.

**SudBury Consultancy**

Holbrook House
Little Waldingfield
SudBury
Suffolk
CO10 0TF
Tel: +44 (0)1787 247595

Birmingham Consultancy

Cornwall Buildings
45 Newhall Street
Birmingham
B3 3QR
Tel: +44 (0)121 270 6680

Manchester Consultancy

Suite 1.9, Canada House
Chepstow Street
Manchester
M1 5FW
Tel: +44 (0)161 929 5585

South Africa Consultancy

102 Heritage House
20 Dreyer Street
Claremont
Cape Town
7708
South Africa
Tel: +27 (0)21 205 9201

London Consultancy

07-106
8 Devonshire Square
London
EC2M 4PL
Tel: +44 (0)207 251 3585

Laboratory

Holbrook House
The Street
SudBury
Suffolk
CO10 0TF
Tel: +44 (0)1787 247595

Website: www.srltsl.com
e-mail: srl@srltsl.com

SRL offers services in:

Acoustics
Air Quality
BREEAM
Laboratory and Site Testing

Registered Name and Address:

SRL Technical Services Limited
Holbrook House
Little Waldingfield
SudBury
Suffolk
CO10 0TF

Registered Number: 907694 England

