Noise Control Limited

AIR HANDLING UNIT AND 3 NO. ASHP'S (RUNNING CONCURRENTLY) AT

HEXAGON TOWER, CRUMPSALL VALE, BLACKLEY, MANCHESTER, M9 8GQ

NOISE VERIFICATION REPORT

On behalf of:

Ductwork Design And Installation Ltd

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AIR HANDLING UNIT AND 3 NO. ASHP'S (RUNNING CONCURRENTLY) AT HEXAGON TOWER, CRUMPSALL VALE, BLACKLEY, MANCHESTER, M9 8GQ

NOISE ASSESSMENT

Report Issued by:
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[redacted]

This Report Is Believed To Be Accurate And True. However, Should A Mistake Be Found, Please Report It To Us As Soon As Possible. Distance Measurements Have Been Used From Online Mapping Solutions Where Necessary. However, The Accuracy Can Not Be Validated By Us.

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1.0 INTRODUCTION

1.1 'Noise Control Ltd (NCL)' was historically commissioned by 'Ductwork Design And Installation Ltd' to carry out a background noise survey and create a noise emission target limit for future industrial/commercial noise at nearest existing residential/noise sensitive receptors to 'Hexagon Tower' located at 'Crumpsall Vale, Blackley, Manchester, M9 8GQ', in connection with a planning application.

1.2 Following completion/installation of fixed plant equipment at the site, the client has requested that compliance checks be undertaken considering pre-determined maximum plant emission noise levels at noise sensitive receptors, as per previous reports NCL270624A.1/.3, in accordance with grant of planning permission condition 3B detailed in documents 142657/FO/2025 and 142546/JO/2025 i.e.;
"b) Prior to the operation of the scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with measures required to ensure compliance with the agreed noise criteria."

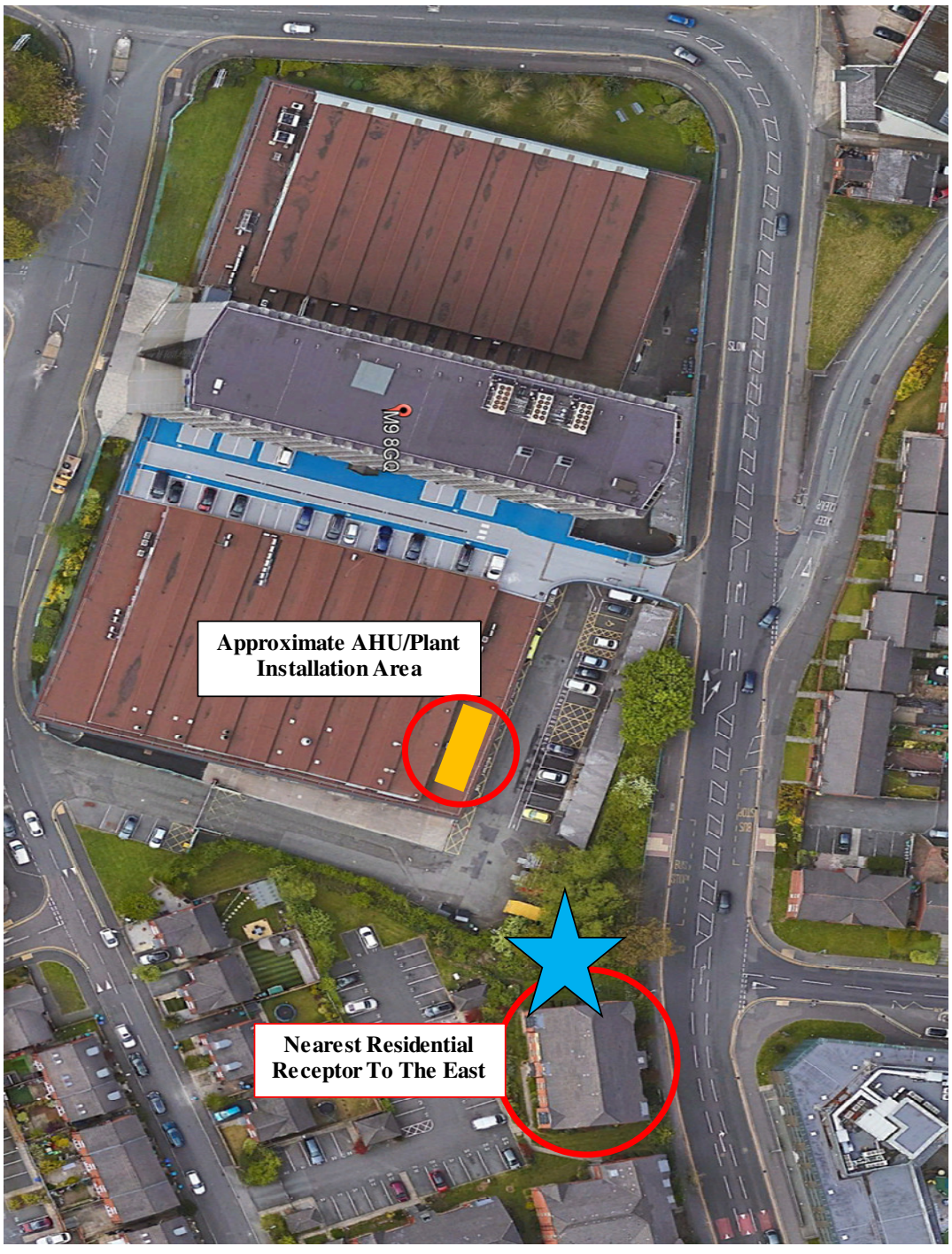
1.3 The nearest existing residential/noise sensitive receptors are understood to be approximately 36m East from the nearest façade of the 'Hexagon Building' whereby roof mounted air handling equipment is located (approximately 41m from newly installed air handling equipment itself (AHU), and 53m from 3 no. air to water heat pump units (ASHP's) serving the main AHU unit), with the ground level of the 'Hexagon Building' site understood to below the ground level of the residential receptors/apartments i.e. there is a land level difference between the site and the nearest receptors.

1.4 Figure 1 and the images overleaf show the original existing site (by nature of a satellite image), and puts the newly installed air handling equipment, and nearest noise sensitive receptors into context. As both the AHU and ASHP's are linked together and run concurrently, it is considered that a single report showing the cumulative noise impact is more appropriate in this instance.

1.5 The assessment has included:

- An inspection of the site and surroundings;
- An assessment of resultant AHU and associated plant equipment noise considering previously created noise emission targets considering the requirements of BS4142:2014 +A1:2019.

1.6 Noise levels referred to in this report, with exception of measurement results where deemed applicable, have been rounded to the nearest whole decibel (dB) as fractions of decibels are imperceptible.



~ Noise Measurement Location(s)

Figure 1 - Site Plan / Plant Equipment Location(s) *Images From Google Earth Pro	Report No. NCL270624A.2	Noise Control Ltd





Images 1 and 2: Newly Installed AHU Plant And External Air To Water Heat Pumps



Image 3: Nearest Noise Sensitive Recptors In Relation To New Plant Equipment

2.0 INDUSTRIAL/COMMERCIAL NOISE LEVELS

2.0 A site visit was carried out on Wednesday the 16th of July 2025 to a) inspect the newly installed plant equipment prior to commission and to b) where possible verify if the newly installed fixed plant equipment is compliant with the grant of planning consent, and previously determined noise emission targets.

2.1 A noise survey was carried out between 11:30 – 13:30 hours at the same background sound measurement location used in report refs.; NCL270624.1/.3 and was again at a raised height equal to approximately 1.5m above receptor ground level, and was free-field in nature (location seen in Figure 1). Whilst this is not quite at the nearest receptor façade, it is representative of noise levels at the boundary for comparative purposes, with any subsequent noise impact at a slight reduced level due to additional distance attenuation.

2.2 Noise surveying was carried out using a Castle GA141 dB Air Type/Class 1 sound level meter (Serial No. 070731) for fixed position noise levels, and for attended specific measurements a Norsonic Nor-140 Type/Class 1 sound level meter (Serial No. 1403571). The calibration level of each meter was checked before and after the survey with a Norsonic Type 1251 sound calibrator (Serial No. 31829), with no significant drift (i.e. >0.1dB in the field-calibrated noise level being observed). A wind shield was fitted in each instance to minimise any external metrological influences.

2.3 The metrological conditions were as follows during the site visit: Windspeed <2.5 m/s, 19-21 degrees C and no rain/wet roads or influencing factors. Cloud cover estimated to be <45-50%.

2.4 The fixed plant equipment was switched off between 11:30 and 12:30 hours, and switched on between 12:30 – 13:30 hours. Subjectively noise at the measurement location was not generally audible with exception of slight tonality around 200 Hz in lulls of road traffic, which is a good indication that the Local Authority criteria for plant noise that of a rating level 5 dB below the existing background sound level is likely to compliant, but must be verified technically. The results of the survey have been illustrated in Table 1, with the current background sound levels relatively comparable to historic levels previously carried out.

Table 1: Existing Ambient Noise Levels

Time (Hours)	Noise Levels, dB			Measurement Location
	L_{Aeq}	L_{A90}	L_{Amax}	
11:30 – 12:30 (15 Min Ranges) (Daytime Period) Plant Off	57	53	67-73	Representative of Noise Receptors To The East In '107 Old Market Street'
11:30 – 12:30 (1 Hour) (Daytime Period) Plant Off	57	53	73	
12:30 – 13:30 (15 Min Ranges) (Daytime Period) Plant On	57-58	53-54	70-74	
12:30 – 13:30 (1 Hour) (Daytime Period) Plant On	57	53	74	

2.5 An assessment of 1 hour noise measurement values show no increase in the L_{Aeq} or L_{A90} levels as would be expected if showing compliance with a negative excess of rating over background sound level. Where any noise cannot physically be measured at a noise sensitive location, a combination of measurement and predictive techniques can be used. In most part, as noise was subjectively in-audible, measurements of noise were undertaken nearer to each source in question, were corrected for the influence of residual noise, and corrected over distance, to result in a rating level for the validation noise assessment. The survey considered operational plant noise from the Air Handling Unit (AHU) itself, However, Due to the time of year, three external air to water heat pumps/condenser units which we understand maintain a specific coolant water temperature, were not running, or fan blades were only just turning. Therefore, manufacturer data has be considered to add this element into the overall verification assessment.

2.6 The results of the noise monitoring and calculated noise levels can be seen in Table 2.

Table 2: Resultant Noise Levels

Description	Noise Levels, dB	Measurement Location
	L_{Aeq}	
Noise From Roof Mounted AHU Unit	62.0	At 2m (Free-Field)
Corrections	1.5 dB residual correction 22.7 dB distance correction (corrected to 41m distance) using mixture of line/point source sound propagation re. 3/6 dB doubling of distance	
Resultant Level	37.8 dB $L_{Aeq(1\ hour)}$ At Nearest Sensitive Receptor	

Mitsubishi PUZ-HWM140YHA Air To Water Heat Pump	57 dB L_{WA}	Manufacturer Sound Power Level
Sound Pressure Level Calculated Using:	$L_p = L_W - \lvert 10 \cdot \log\left(\frac{Q}{4\pi \cdot r^2}\right) \rvert$ Q = 2 With one surface underneath the source Distance = 53M	
Noise Level Per Unit	26.8 dB $L_{Aeq(1\ hour)}$ At Nearest Sensitive Receptor 3 No. Units = 31.6 dB $L_{Aeq(1\ Hour)}$ (Worst-case with no screening applied and 100% Duty Cycle)	
Combined Specific Level	38.7 dB $L_{Aeq(1\ hour)}$ At Noise Sensitive Receptors	

2.7 The calculated commercial/industrial plant noise levels detailed in Table 2, have been used as a basis for our noise assessment in Section 3.0.

3.0 NOISE ASSESSMENT

3.0 British Standard 4142: 2014+A1:2019, 'Methods for rating and assessing industrial and commercial sound' can be used by Local Authorities, regulatory bodies and other professionals to assess the levels of adverse impact due to nearby industrial/commercial noise sources.

3.1 BS 4142 requires the noise from the process/equipment (in L_{Aeq}) to be compared with the background noise level (L_{A90}) in the absence of any machine noise. A correction to the 'Specific Sound Level' is sometimes necessary considering the residual sound level, along with acoustic penalties which are added for any sound which is/or can be considered to be tonal, impulsive or have other characteristics, depending on the context.

3.2 British Standard 4142 states that if the rated noise level exceeds the L_{A90} background sound level by around +10 dB or more, then it is likely that the resultant noise may have a significant adverse impact, a difference of around +5 dB over the background sound level is likely to have an adverse impact, and where the rating level does not exceed the background sound level it is an indication that the resultant noise is likely to have a low adverse impact, depending on the context.

3.3 Adverse impact "may include, but not limited to, annoyance and sleep disturbance." However, "not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact." (as defined in BS 4142)

3.4 The derived noise emission limit criteria from reports NCL270624A.1/.3 have been repeated in Table 3.

Table 3: Maximum Noise Emission Limit Criteria

Description/Location	Typical Background Sound Level L_{A90}	Maximum Rating Level L_{Ar}[>]
At The Nearest Noise Receptors To The East (During AHU & 3 No. ASHP Proposed Operational Periods) 07:30 – 17:30 Hours	53 dB	48 dB (1 hour)
At The Nearest Noise Receptors To The East (During AHU & 3 No. ASHP Extended Late Evening Periods) Up To 23:00 Hours	50 dB	45 dB (1 hour)

[>]Including Acoustic feature Corrections Where Necessary

3.5 The subjective rating acoustic feature approach from BS 4142 has been considered in this assessment which establishes the following acoustic penalties as detailed in Table 4, but the objective 1/3 octave method has also been considered to verify the subjectivity.

Table 4: Subjective Acoustic Feature Penalties BS 4142: 2014+A1:2019

Tonality		Impulsivity	
Correction	**Correction Criteria**	**Correction**	**Correction Criteria**
+2	Tone Just Perceptible	+3	Impulsivity Just Perceptible
+4	Tone Clearly Perceptible	+6	Impulsivity Clearly Perceptible
+6	Tone Highly Perceptible	+9	Impulsivity Highly Perceptible
If the intermittency is readily distinctive against the residual acoustic environment a penalty of 3 dB can be applied. Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent though otherwise are readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied (From British Standard 4142:2014+A1:2019: Section 9.2)			

3.6 Table 5 shows the resultant noise levels as measured or predicted, considering the predicted noise impact, assessed against BS 4142:2014+A1:2019.

Table 5: Assessment to British Standard 4142: 2014+A1:2019

What/Where	Specific Noise Level $L_{Aeq(1\ Hour)}$	Correction(s)	Rating Level	Background Sound Level L_{A90}	Excess Of Rating Level Over Background Sound Level
At Nearest Noise Sensitive Façade East '107 Old Market Street' (Daytime)	38.7 dB	In The 1/3 Octave Spectrum Tonality Was Identified = +6	44.7 dB	53	-8.0
At Nearest Noise Sensitive Façade East '107 Old Market Street' (Evening)	38.7 dB	In The 1/3 Octave Spectrum Tonality Was Identified = +6	44.7 dB	50	-5.3

*Noise from the extraction system was subjectively in-audible with exception of slight tonal aspect in lulls of road traffic, and therefore as a worst-case scenario a correction of +6 has been applied.

3.7 The result of our assessment in line with BS 4142:2014+A1:2019 demonstrates that based on the predicted/calculated rating noise levels, it is likely that the resultant noise is not expected to exceed the

background sound level and is therefore an indication that the resultant noise is likely to have a low adverse impact, including acoustic feature corrections in accordance with BS 4142. Furthermore, the maximum emission noise limit criteria of 48 dB L_{Ar} and 45 dB L_{Ar} applicable to each operational period are not expected to be exceeded i.e. noise from the AHU installation and air to water heat pumps (ASHP's) are compliant, and no further mitigation measures should be required.

3.8 As with all assessments, there is a risk of uncertainty. However, considering noise was not generally audible at the boundary of the nearest noise sensitive façades, and the rated noise level is below the existing ambient noise levels/background sound levels i.e. our calculations mimic and reinforce a rating level below the existing background sound level, any risk is at a reduced level.

4.0 SUMMARY AND CONCLUSION(S)

4.0 'Noise Control Ltd (NCL)' was historically commissioned by 'Ductwork Design And Installation Ltd' to carry out a background noise survey and create a noise emission target limit for future industrial/commercial noise at nearest existing residential/noise sensitive receptors to 'Hexagon Tower' located at 'Crumpsall Vale, Blackley, Manchester, M9 8GQ', in connection with a planning application.

4.1 Following completion/installation of fixed plant equipment at the site, the client has requested that compliance checks be undertaken considering pre-determined maximum plant emission noise levels at noise sensitive receptors, as per previous reports NCL270624A.1/.3, in accordance with grant of planning permission condition 3B detailed in documents 142657/FO/2025 and 142546/JO/2025 i.e.;
"b) Prior to the operation of the scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with measures required to ensure compliance with the agreed noise criteria."

4.2 To check compliance with the condition above and validate the scheme, a site visit has been carried out to enable the measurement and calculation/prediction of resultant noise, and to carry out an assessment of the noise impact in accordance with British Standard 4142: 2014+A1:2019, 'Methods for rating and assessing industrial and commercial sound' considering our previous reports NCL270624A.1/.3.

4.3 The result of our assessment in line with BS 4142:2014+A1:2019 demonstrates that based on the predicted/calculated rating noise levels, it is likely that the resultant noise is not expected to exceed the background sound level and is therefore an indication that the resultant noise is likely to have a low adverse impact, including acoustic feature corrections in accordance with BS 4142. Furthermore, the maximum emission noise limit criteria of 48 dB L_{Ar} and 45 dB L_{Ar} applicable to each operational period are not expected to be exceeded i.e. noise from the AHU installation and air to water heat pumps (ASHP's) are compliant, and no further mitigation measures should be required.

4.4 Therefore, in our professional capacity, this document should demonstrate that the installed fixed plant equipment at the 'Hexagon Tower' site complies with *Condition 3B* of the associated planning consent notices 142657/FO/2025 and 142546/JO/2025, and should therefore be able to be subsequently discharged.

APPENDIX I – NOISE UNITS AND INDICES

dB

The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. When measuring sound (or noise) levels, it usually ranges from 0 dB (the threshold of hearing) to 140 dB (the threshold of pain).

dB(A)

Are decibels measured using a sound level meter using a frequency rating which relates sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) generally agree with peoples assessment of loudness.

Hz

Is a unit of frequency which is equal to one cycle per second. The frequency is related to the pitch of a sound.

L_{Aeq}

This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period.

L_{Amax}

This is the maximum A-weighted noise level that was recorded during the monitoring period.

L_{A10}

Is the A-weighted noise level exceeded for 10% of the measurement duration (T).

L_{A90}

Is the A-weighted noise level exceeded for 90% of the measurement duration (T) and is generally used to define the background noise level.

SEL

This is the 'sound exposure level' of a single event (such as a passing train) and is the L_{Aeq} value of the whole event normalised to a 1 second period level of a sound.

Insertion Loss

This is the measure of the effectiveness of an enclosure, silencer or product/device, in dB, considering the difference between the noise level with and without the product/device present.