Noise Control Limited

INSTALLATION OF 3 NO. AIR SOURCE HEAT PUMPS AT HEXAGON TOWER

CRUMPSALL VALE, BLACKLEY, MANCHESTER, M9 8GQ

NOISE ASSESSMENT

On behalf of:

Ductwork Design And Installation Ltd

Noise Control Ltd
Suite 1.08 Clarence Arcade
Ashton-Under-Lyne
Tameside
Greater Manchester
OL6 7LT



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Report No. NCL270624A/3 Rev. 1
August 2025

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Noise Control Ltd
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Ashton-Under-Lyne
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Greater Manchester
OL9 7LT

On behalf of:
Ductwork Design And Installation Ltd
Unit D5 Europa Trading Estate
Stoneclough Road
Radcliffe
Manchester
M26 1GG

Report prepared by:
Anthony Robertshaw BSc (Hons) Dip. AMIOA

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 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 the 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 At this juncture, we understand that proposals for the site include the installation and operation of 3 No. air source heat pumps (ASHP's), operating concurrently with previous application number 142546/JO/2025 (for an air handling unit (AHU) at roof level) between 07:30 – 17:30 hours towards the North East of the site, with the nearest residential receptors/sensitive receptors confirmed by the client to be those directly adjacent at the Eastern site boundary, understood to be flats/apartments within '107 Old Market Street'.

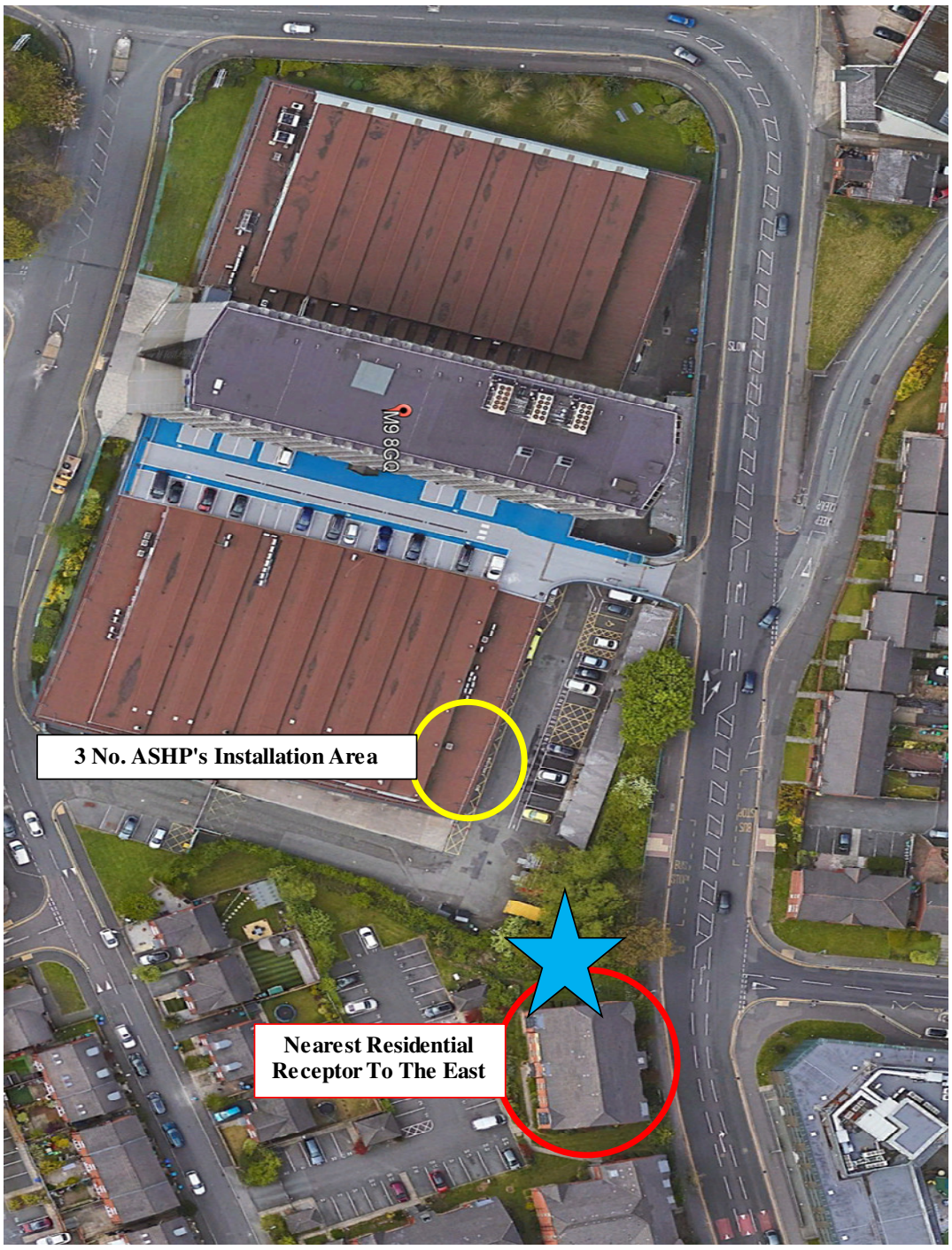
1.3 The nearest existing residential/noise sensitive receptors are understood to be approximately 36m East from the nearest façade of the 'Hexagon Building' whereby roof mounted air handling equipment (and ASHP's) are proposed, with the ground level of the 'Hexagon Building' site understood to below 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 overleaf shows the existing site (by nature of a satellite image), and puts the proposed installation location, and nearest noise sensitive receptors into context.

1.5 The assessment has included:

- An inspection of the site and surroundings;
- Daytime measurements of existing ambient background sound levels;
- An assessment of existing ambient noise levels, to create an emission target regarding BS 4142:2014+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 / Survey Locations *Images From Google Earth Pro	Report No. NCL270624A.3	Noise Control Ltd

2.0 ACOUSTIC/NOISE DESIGN CRITERIA

2.0 The 'National Planning Policy Framework (NPPF) updated December 2024' states in section 198:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life[60];

2.1 In conjunction with the 'National Planning Policy Framework (NPPF) 2024', 'The Noise Policy Statement for England (NPSE)', dated March 2010, states the following regarding a long term vision of government noise policy:

"Noise Policy Aims: Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life."*

2.2 In terms of the NPSE, the impact of noise can be categorised by the following terms:

- NOEL - No Observed Effect Level - The level where no effect can be detected
- LOAEL - Lowest Observed Adverse Effect Level - The level where adverse effects on health and quality of life can be detected
- SOAEL - Significant Observed Adverse Effect Level - The level where significant adverse effects on health and quality of life may occur.

2.3 The NPSE further states that: *"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times."*

2.4 No specific guidance is detailed or given in the 'National Planning Policy Framework (NPPF) 2024', or 'The Noise Policy Statement For England (NPSE)' in terms of acceptable acoustic criteria/noise criteria in order to achieve the 'NOEL, LOAEL or SOAEL'. Therefore, it is considered necessary to refer to alternate national guidance, preferably standardised or regulated.

2.5 In terms of industrial/commercial development, guidance is set out in BS 4142: 2014+A1:2019, 'Methods for rating and assessing industrial and commercial sound'. BS 4142 requires the noise from the process/equipment (in L_{Aeq}) to be compared with the background sound level (L_{A90}) in the absence of any machine noise. In relation to BS 4142:2014+A1:2019, we have considered that the NOEL or 'No Observed Effect Level' may represent a 0 dB rating level above background sound level, the LOAEL or 'Lowest Observed Adverse Effect Level' may represent around a +5 dB rating level above background sound level, and the SOAEL or 'Significant Observed Adverse Effect Level' may represent a 10 dB or more rating level above background sound level.

2.6 Further to the above, we understand that the Local Authority has detailed in the relevant planning permission decision notice under application number Ref: 142657/FO/2025, that "Externally mounted ancillary 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 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location", which we understand need be in accordance with BS 4142:2014+A1:2019.

3.0 AMBIENT AND BACKGROUND SOUND LEVEL SURVEY

3.0 Un-attended measurements of the existing background noise climate were carried out at the boundary of the nearest existing residential flats/noise sensitive receptors to the East, at the location illustrated in Figure 1. The measurement position was free-field in nature i.e. at least 3.5m distance away from any reflective facades/surfaces.

3.1 When considering background noise levels, British Standard 4142: 2014, 'Methods for rating and assessing industrial and commercial sound' states that *"the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular periods"*. Therefore, the background noise levels were measured during the daytime on Wednesday the 17th July 2024 between 07:00 – 23:00 hours i.e. during proposed operational periods (that of 07:30 – 17:30), with additional monitoring into the late evening, should future operational hours change or be proposed (as required). The background noise levels were taken at a height of approximately 1.5m above the receptor ground level, by means of an extension pole from the 'Hexagon Tower' land, and were recorded over 15-minute sample durations.

3.2 The noise measurements were recorded using a Castle GA141 dB Air Type/Class 1 sound level meter (Serial No. 070731). The calibration level of the meter was checked before and after the surveys with a Norsonic Type 1251 sound calibrator (Serial No. 31829) with no variation in level observed. The microphone had a windshield fitted.

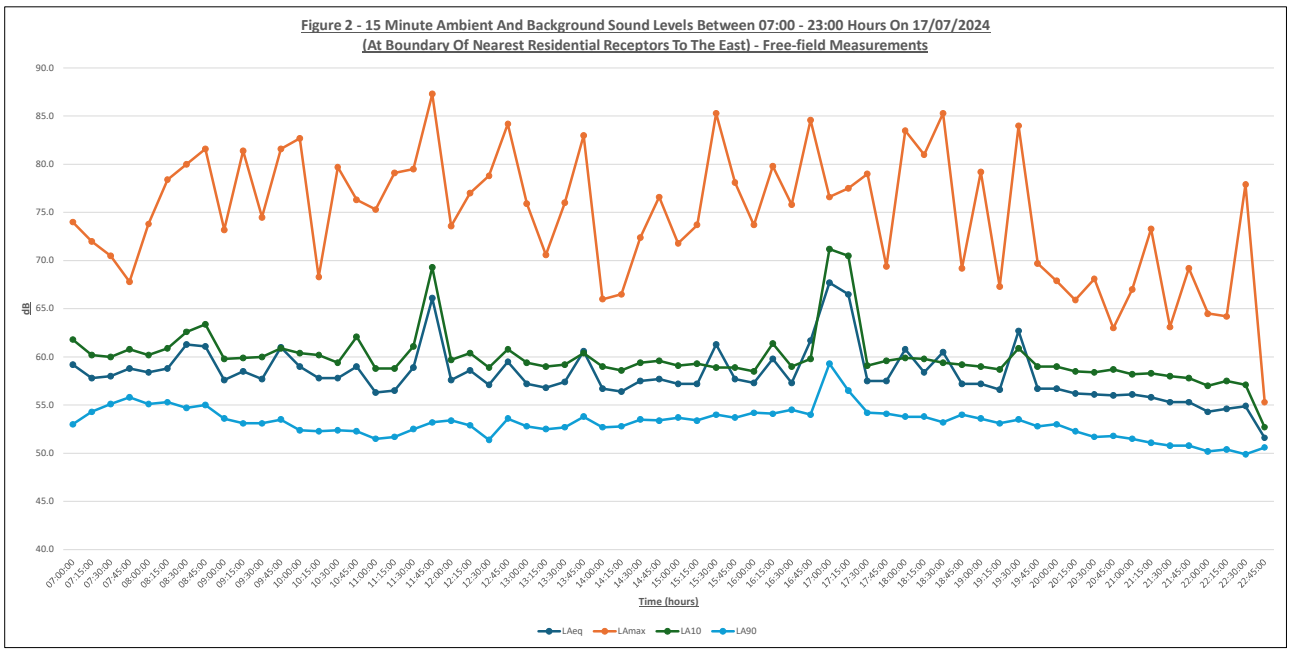
3.3 The weather conditions during the survey were dry, (cool approx. 13 degrees C Start, rising to warm 22 degrees C during the daytime, and falling to 18 degrees C by 23:00 hours) and with light breeze (<2.5 m/s) at all times. Cloud cover was moderate throughout the survey period. It was noted that at the start and end of the survey, the dominant noise source appeared road traffic on 'Mill Brow/Old Market Street'. However, low level plant noise from other commercial equipment at the 'Hexagon Tower' building was audible (including external containers with what we understand have standalone refrigeration plant equipment).

3.4 The results of the background noise survey have been summarised in Table 1 and Figure 2, with typical background sound levels determined during proposed operational periods via statistical analysis in Figure 3, with the complete survey results detailed in Appendix II.

Table 1: Existing Ambient Noise Levels

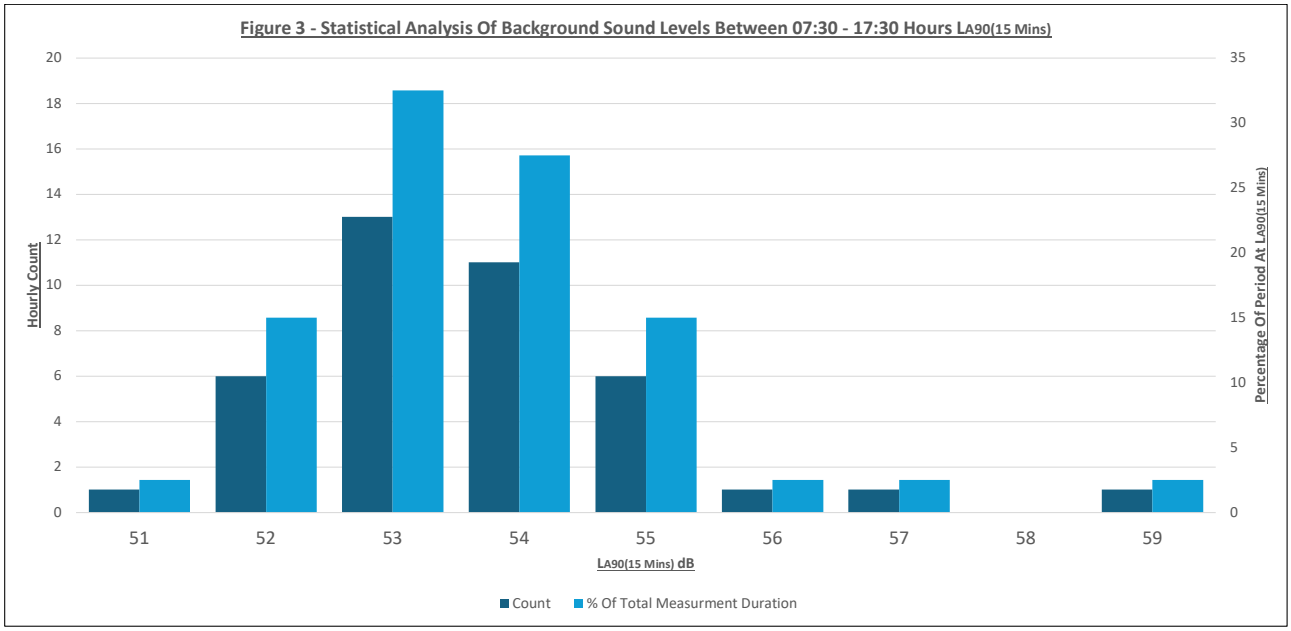
Time (Hours)	Noise Levels, dB			Measurement Location
	L_{Aeq}	L_{A90}	L_{Amax}	
07:00 – 23:00 (15 mins) (Daytime Period)	52-68	50-59	55-87	Representative of Noise Receptors To The East In '107 Old Market Street'
07:30 – 17:30 (15 mins) (Proposed ASHP's Hours)	56-68	51-59	66-87	
19:00 – 23:00 (15 mins) (Evening Period)	52-63	50-54	55-84	

Figure 2: Survey Data During Complete Daytime Period (07:00 – 23:00 Hours)



…Continued Overleaf

Figure 3: Statistical Analysis Of Background Sound Data During Proposed Operational Hours



3.5 In this case, the most frequent/typical background sound level during the proposed air source heat pump (ASHP) operational hours (of the daytime period) has been derived to be 53 dB $L_{A90(15\ minute)}$ during the daytime, representative of the nearest existing residential receptors to the East. If plant hours are revised to enable late evening use in the future, then repeat periods of background sound with a noise level of 50 dB $L_{A90(15\ minute)}$ were evidenced accordingly.

3.6 The background sound levels derived above have been used as a basis for our noise assessment in Section 4.0.

4.0 INDUSTRIAL/COMMERCIAL NOISE

4.0 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.

4.1 British Standard 4142: 2014+A1:2019, 'Methods for rating and assessing industrial and commercial sound' requires noise to be assessed over a 1 hour duration during the daytime, and a 15 minute period during the night-time. Where any noise cannot physically be measured at a noise sensitive location, a combination of measurement and predictive techniques can be used.

4.2 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.

4.3 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. As previously detailed, the relevant Local Authority planning requirement considers the above but amends the excess of background sound (likely to prevent background sound creep) considering a rating level of -5 dB below the existing background sound level.

4.4 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)

4.5 To this effect, the cumulative rating level of any equipment, to include acoustic feature corrections where necessary at residential properties/noise sensitive receptors to the East, should be no more than the levels outlined in Table 2, to comply with a rating level 5 dB below the existing background sound level L_{A90}.

Table 2: 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

5.0 SUMMARY AND CONCLUSION(S)

5.0 Noise Control Ltd (NCL) was 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 the nearest existing residential/noise sensitive receptors to 'Hexagon Tower' located at 'Crumpsall Vale, Blackley, Manchester, M9 8GQ', in connection with a planning application.

5.1 This has involved carrying out an ambient noise and background sound survey representative of the nearest existing residential dwellings/noise sensitive receptors to the East and the creation of a cumulative noise emission rating level design criteria (L_{Ar}) for industrial/commercial noise generated by externally mounted fixed plant equipment, when assessed in conjunction with British Standard 4142: 2014+A1:2019, 'Methods for rating and assessing industrial and commercial sound'.

5.2 In order for any industrial/commercial noise to meet the adopted Local Authority criteria (and be compliant with British Standard 4142: 2014+A1:2019, 'Methods for rating and assessing industrial and commercial sound'), the cumulative noise (rating level) produced from proposed air handling unit equipment should be limited to 48 dB $L_{Ar(1\ hour)}$ (including any BS 4142 acoustic feature/other corrections) at the nearest existing noise sensitive receptors/flats/apartments to the East during proposed daytime operational hours. If future use of the air source heat pump (ASHP) equipment is sought, a reduction in plant equipment emission noise levels to permit late evening use may be considered, provided cumulative noise emissions are reduced to 45 dB $L_{Ar(1\ hour)}$ (including any BS 4142 acoustic feature/other corrections) accordingly.

5.3 Any recommendations in this report have been given for acoustical reasons only. Therefore, if relevant, any other requirements, for example structural, fire or otherwise, should be checked by the relevant professional.

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.

APPENDIX II – RESULTS OF NOISE SURVEYS

Dates: 17th July 2024

Equipment: See Section 3.0

Weather: See Section 3.0.

Measurement Location(s): At The Boundary Of Nearest Receptors (See Figure 1)

Table A1: Background Noise/Sound Levels Surveyed – Free-field

Date	Time	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/07/2024	07:00:00	59.2	74.0	61.8	53.0
17/07/2024	07:15:00	57.8	72.0	60.2	54.3
17/07/2024	07:30:00	58.0	70.5	60.0	55.1
17/07/2024	07:45:00	58.8	67.8	60.8	55.8
17/07/2024	08:00:00	58.4	73.8	60.2	55.1
17/07/2024	08:15:00	58.8	78.4	60.9	55.3
17/07/2024	08:30:00	61.3	80.0	62.6	54.7
17/07/2024	08:45:00	61.1	81.6	63.4	55.0
17/07/2024	09:00:00	57.6	73.2	59.8	53.6
17/07/2024	09:15:00	58.5	81.4	59.9	53.1
17/07/2024	09:30:00	57.7	74.5	60.0	53.1
17/07/2024	09:45:00	61.0	81.6	60.9	53.5
17/07/2024	10:00:00	59.0	82.7	60.4	52.4
17/07/2024	10:15:00	57.8	68.3	60.2	52.3
17/07/2024	10:30:00	57.8	79.7	59.4	52.4
17/07/2024	10:45:00	59.0	76.3	62.1	52.3
17/07/2024	11:00:00	56.3	75.3	58.8	51.5
17/07/2024	11:15:00	56.5	79.1	58.8	51.7
17/07/2024	11:30:00	58.9	79.5	61.1	52.5
17/07/2024	11:45:00	66.1	87.3	69.3	53.2
17/07/2024	12:00:00	57.6	73.6	59.7	53.4
17/07/2024	12:15:00	58.6	77.0	60.4	52.9
17/07/2024	12:30:00	57.1	78.8	58.9	51.4
17/07/2024	12:45:00	59.5	84.2	60.8	53.6
17/07/2024	13:00:00	57.2	75.9	59.4	52.8
17/07/2024	13:15:00	56.8	70.6	59.0	52.5
17/07/2024	13:30:00	57.4	76.0	59.2	52.7
17/07/2024	13:45:00	60.6	83.0	60.4	53.8
17/07/2024	14:00:00	56.7	66.0	59.0	52.7
17/07/2024	14:15:00	56.4	66.5	58.6	52.8
17/07/2024	14:30:00	57.5	72.4	59.4	53.5
17/07/2024	14:45:00	57.7	76.6	59.6	53.4

17/07/2024	15:00:00	57.2	71.8	59.1	53.7
17/07/2024	15:15:00	57.2	73.7	59.3	53.4
17/07/2024	15:30:00	61.3	85.3	58.9	54.0
17/07/2024	15:45:00	57.7	78.1	58.9	53.7
17/07/2024	16:00:00	57.3	73.7	58.5	54.2
17/07/2024	16:15:00	59.8	79.8	61.4	54.1
17/07/2024	16:30:00	57.3	75.8	59.0	54.5
17/07/2024	16:45:00	61.7	84.6	59.8	54.0
17/07/2024	17:00:00	67.7	76.6	71.2	59.3
17/07/2024	17:15:00	66.5	77.5	70.5	56.5
17/07/2024	17:30:00	57.5	79.0	59.1	54.2
17/07/2024	17:45:00	57.5	69.4	59.6	54.1
17/07/2024	18:00:00	60.8	83.5	59.9	53.8
17/07/2024	18:15:00	58.4	81.0	59.8	53.8
17/07/2024	18:30:00	60.5	85.3	59.4	53.2
17/07/2024	18:45:00	57.2	69.2	59.2	54.0
17/07/2024	19:00:00	57.2	79.2	59.0	53.6
17/07/2024	19:15:00	56.6	67.3	58.7	53.1
17/07/2024	19:30:00	62.7	84.0	60.9	53.5
17/07/2024	19:45:00	56.7	69.7	59.0	52.8
17/07/2024	20:00:00	56.7	67.9	59.0	53.0
17/07/2024	20:15:00	56.2	65.9	58.5	52.3
17/07/2024	20:30:00	56.1	68.1	58.4	51.7
17/07/2024	20:45:00	56.0	63.0	58.7	51.8
17/07/2024	21:00:00	56.1	67.0	58.2	51.5
17/07/2024	21:15:00	55.8	73.3	58.3	51.1
17/07/2024	21:30:00	55.3	63.1	58.0	50.8
17/07/2024	21:45:00	55.3	69.2	57.8	50.8
17/07/2024	22:00:00	54.3	64.5	57.0	50.2
17/07/2024	22:15:00	54.6	64.2	57.5	50.4
17/07/2024	22:30:00	54.9	77.9	57.1	49.9
17/07/2024	22:45:00	51.6	55.3	52.7	50.6