



Hinckley Academy

Noise Impact Assessment

dBx Acoustics Ltd
Beehive Mill
Jersey Street
Manchester
M4 6JG
0161 711 0320

22082-R02B-JT- Hinckley Academy

SPL001-DBX-XX-XX-T-J-0001

Client: Reds 10 (UK) Ltd

Date: 29/06/2023

TABLE OF CONTENTS

TABLE OF CONTENTS	2
REVISION HISTORY	3
1 INTRODUCTION	4
2 BASIS OF NOISE ASSESSMENT	5
LOCAL AUTHORITY REQUIREMENTS	5
BUILDING BULLETIN 93	6
BS 4142:2014 – METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND	7
3 THE SITE, SITE SETTING AND PROPOSED DEVELOPMENT	8
SITE DESCRIPTION	8
NEARBY NOISE SENSITIVE RECEPTORS (NSRs)	8
PROPOSED DEVELOPMENT	8
4 NOISE CLIMATE	9
NOISE SURVEY	9
5 NOISE MODEL	10
6 BUILDING ENVELOPE SOUND INSULATION	13
INDOOR AMBIENT NOISE CRITERIA	13
OVERHEATING	13
BUILDING FAÇADE ASSESSMENT	14
NOISE FROM MECHANICAL VENTILATION UNITS	16
7 BUILDING SERVICES NOISE EMISSIONS	17
PROPOSED PLANT	17
BS4142 ASSESSMENT	18
8 EXTERNAL PLAY AREAS – SCHOOL USE DURING BREAK-TIMES	20
MODEL INPUT	20
ASSESSMENT STANDARDS AND GUIDANCE	20
EXISTING CONDITIONS	20
PREDICTED PLANT NOISE AND DISCUSSION	21
9 SUMMARY AND CONCLUSION	23
APPENDIX A – GLOSSARY OF ACOUSTIC TERMINOLOGY	24
APPENDIX B – NOISE SURVEY DATA- TETRA TECH REPORT	26
APPENDIX C – MANUFACTURERS’ NOISE DATA	27
APPENDIX D – SOUND ATTENUATOR INSERTION LOSS DETAILS	32

REVISION HISTORY

Revision	Date	Revision Details	Author	Checked
R02	03/02/2023	Original Issue	Joseph Tony BTech MIOA	Susan Witterick BSc MIOA
R02A	22/03/2023	Updated to include external playarea noise assessment	Joseph Tony BTech MIOA	Ben Tomlin BSc MIOA
R02B	28/06/2023	Updated to adress EHO comments	Joseph Tony BTech MIOA	Susan Witterick BSc MIOA
R02C	03/07/2023	Updated to include attenuator selections	 Joseph Tony (Jul 3, 2023 12:26 GMT+1) Joseph Tony BTech MIOA	 Susan Witterick BSc MIOA

1 INTRODUCTION

- 1.1 It is proposed to demolish an existing school block at the Hinckley Academy and John Cleveland Sixth Form College, Hinckley, LE10 1LE and replace with a new three-storey STEM block. The Local Authority is Hinckley and Bosworth Borough Council (HBBC).
- 1.2 dBx Acoustics Ltd has been appointed by Reds10 (UK) Ltd. to undertake a noise impact assessment for the proposed new building.
- 1.3 Reference has been made to noise survey undertaken at the site by Tetra Tech (included within Appendix B), when assessing noise impact to the surroundings and environmental noise affecting the development.
- 1.4 A glossary of acoustic terminology has been supplied in Appendix A in order to assist the reader.

2 BASIS OF NOISE ASSESSMENT

- 2.1 Information regarding existing noise levels has been taken from the Noise Constraints Assessment Report issued by Tetra Tech on 23rd July 2021.
- 2.2 A noise survey was carried out by Tetra Tech between 7th and 12th July 2021. The monitoring locations and measurement results extracted from this report are presented in Appendix B. dBx Acoustics Ltd cannot accept responsibility for the accuracy of the information contained therein.
- 2.3 This report considers the Site's suitability for the nature of proposed uses through assessment of existing noise levels affecting the site, which have been used to carry out the following works:
- To determine prevailing environmental noise levels affecting the site of the proposed school buildings due to nearby noise sources (e.g. road traffic);
 - Assessment of potential noise intrusion to school spaces and development of preliminary sound reduction requirements for the building façades with consideration of the proposed ventilation strategy;
 - The setting of appropriate noise emission limits for new fixed building services plant associated with the development.
- 2.4 The noise impact assessment is based on the following:
- Department for Education (2015) 'BB93 Acoustic Design of Schools'. (BB93)
 - BS4142:2014 'Methods for Rating and Assessing Commercial Sound'

Local Authority Requirements

- 2.5 Hinckley and Bosworth Borough Council (HBBC) has published a number of guidance documents however, there is no published quantitative guidance on acoustic criteria for noise emissions from building services plant items.
- 2.6 dBx Acoustics has consulted with the Environmental Health Department of HBBC concerning the plant noise standard adopted by the Council in controlling the impact of noise from external plant and equipment.
- 2.7 Further to liaison with the Giles Rawdon, Environmental Health Officer (Pollution), it is understood that HBBC has no formally adopted criteria for the control of building services noise emissions, but would expect the BS4142:2014 rating level $L_{A,T,r}$ to be no higher than the existing background noise level, and ideally 5dB lower than this.

Building Bulletin 93

- 2.8 Requirement E4 from Part E of Schedule 1 to The Building Regulations 2000 (as amended) states that:

"Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use."

- 2.9 These regulations came into force in July 2003.

- 2.10 Part E of the Building Regulations includes schools within its scope, and gives the following guidance:

"In the Secretary of State's view, the normal way of satisfying Requirement E4 will be to meet the values for sound insulation, reverberation time and internal ambient noise which are given in Section 1 of Building Bulletin 93 'The Acoustic Design of Schools', produced by DfES."

- 2.11 The School Premises Regulations contain similar statements and apply to both new and existing school buildings.
- 2.12 Building Bulletin 93 (BB93) was updated in 2014 and is the current design standard applicable to compliance with the Building Regulations and the School Premises Regulations. This document includes design standards for indoor ambient noise levels, reverberation time, and sound insulation between critical spaces.
- 2.13 Building Bulletin 93 specifies upper limits for indoor ambient noise level for room types classified in terms of intended use.
- 2.14 The objective is to provide suitable indoor ambient noise levels (a) for clear communication of speech between teacher and student (b) clear communication between students and (c) learning and study activities. The indoor ambient noise level includes noise contributions from:
- External sources outside the school premises (including, but not limited to, noise from road, rail and air traffic, industrial and commercial premises);
 - Building services (e.g. ventilation system, plant, etc); and
 - Actuator and damper noise.
- 2.15 Where rooms are mechanically ventilated, the plant should be assumed to be running at its maximum operating duty.

Table 1: BB93 Indoor Ambient Noise Level Criteria

Room Type	Upper Limit for Indoor Ambient Noise Level
	dB L _{Aeq,30 min}
Secondary Classrooms, Small Group rooms	35
DT, Art, Food, CAD/CAM, Science Laboratories	40
Staff Work Room and Offices	40
Corridor, WC	50

- 2.16 Additionally, in order to protect students from regular discrete noise events, ambient noise levels should not exceed $60\text{dB}_{\text{LA1,30mins}}$.
- 2.17 The indoor ambient noise level excludes noise contributions from teaching activities within the school premises, including noise from staff, students and equipment within the building or in the playground. Noise transmitted from adjacent spaces is addressed by the airborne and impact sound insulation requirements, which will be determined as the building design progresses.

BS 4142:2014 – Methods for Rating and Assessing Industrial and Commercial Sound

- 2.18 BS 4142:2014 sets out a procedure for assessing noise impact whereby a Noise Rating is determined and compared with the existing local Background Sound Level.
- 2.19 The Rating Level ($\text{dBL}_{\text{Ar,Tr}}$) is evaluated from the Specific Noise Level by including several, cumulative corrections to account for factors such as distinguishable tone, impulse, intermittency or other readily distinguishable sound characteristics.
- 2.20 BS 4142:2014 seeks to determine a “representative” Background Sound Level, stating that “...the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods”.
- 2.21 The assessment of the impact depends upon the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level. An initial estimate of the impact of the specific sound is made by subtracting the Background Sound Level from the Rating Level, while considering the following points:
- a) Typically, the greater this difference, the greater the magnitude of the impact.
 - b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
 - d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant 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.

3 THE SITE, SITE SETTING AND PROPOSED DEVELOPMENT

Site Description

- 3.1 The proposed new building is at the northern end of the existing Hinckley Academy and John Cleveland Sixth Form College campus.
- 3.2 The site is located off Butt Lane, with existing campus buildings immediately to the west and south. To the north are residential receptors (Bradgate Gardens). Hinckley Golf Course is located to the east.
- 3.3 Figure 1 below illustrates the location of the site boundary and the nearby noise sensitive receptors.

Figure 1: Site Boundary and Nearby Noise Sensitive Properties



Nearby Noise Sensitive Receptors (NSRs)

- 3.4 The proposed development site is located adjacent to the existing Hinckley Academy and John Cleveland Sixth Form College. The nearest residential receptors are at approximately 25m to the north of the site at Bradgate Gardens/Olympic Gate, as illustrated on Figure 1 above.

Proposed Development

- 3.5 The proposed development comprises a new three storey STEM building. It includes general, science, art, ICT, photography DT, and food classrooms, and administration and ancillary spaces.

4 NOISE CLIMATE

Noise Survey

- 4.1 Information regarding existing noise levels has been taken from the Noise Constraints Assessment Report issued by Tetra Tech on 23rd July 2021.
- 4.2 A noise survey was carried out by Tetra Tech between 7th and 12th July 2021. The monitoring locations and measurement results extracted from this report are presented in Appendix B. dBx Acoustics Ltd cannot accept responsibility for the accuracy of the information contained therein.
- 4.3 It is understood from the noise survey that the dominant noise source affecting site is road traffic on Butt Lane and Woodland Road.
- 4.4 The monitoring locations are presented in Figure 2.

Figure 2: Noise Monitoring Locations



- 4.5 The ambient noise levels from the noise survey results (Appendix B) has used to calibrate the noise model and the lowest measured background noise levels measured at Location ST3 have been used to set the noise emission limits for building services plant.

Figure 4: Daytime Noise Map -Site and Surroundings

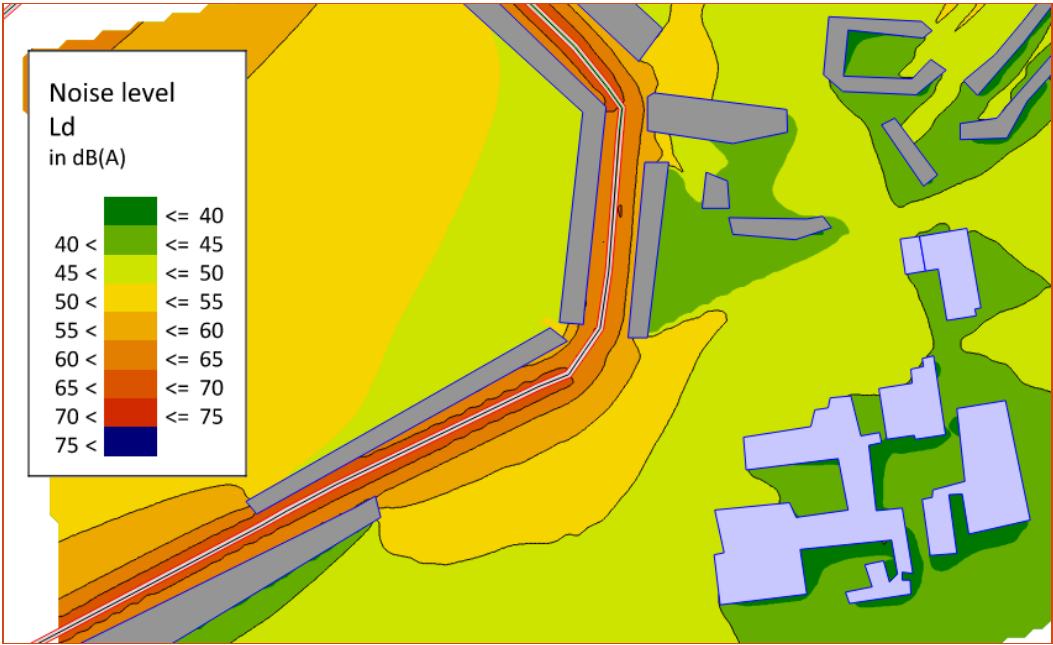


Figure 5: Daytime Noise Map – Site Only (1.5m above ground)



- 5.5 Based on the results of the noise model, Table 2 below presents a summary of the predicted typical daytime external noise levels at the facades of the proposed development.

Table 2: Predicted Typical Daytime Noise Levels at the Facades of the Proposed Development

Façade Direction	Receiver	Daytime Ambient dB $L_{Aeq,30minutes}$
North	General Classrooms, Science, DT Classrooms, Staff Rooms	51
West	Science, DT, Textile, Photography, ICT Classrooms	51
East	General Classrooms, Science, Food/DT, Textile Classrooms, Staff Rooms	49
South	General Classrooms, Science, Art, Classrooms	46

6 BUILDING ENVELOPE SOUND INSULATION

Indoor Ambient Noise Criteria

- 6.1 An external noise break-in assessment has been undertaken to assess the suitability of the site for the proposed development.
- 6.2 In accordance with BB93 guidance, for naturally ventilated teaching spaces, an internal noise level limit of 40 dBL_{Aeq,30mins} is considered appropriate for general classrooms and 45dBL_{Aeq,30mins} for DT/Art/Food/Science Laboratory/Photography/Textile classrooms. BB93 also states that where external ambient free field noise levels at the façade do not exceed the IANL figures given in Table 1 by more than 16 dB for single sided ventilated spaces and 20dB for cross ventilated or roof ventilated spaces, the criteria for natural ventilation can usually be achieved.
- 6.3 Based on the results of the noise survey and the predicted façade incident noise levels (Table 2), natural ventilation is therefore suitable for all teaching spaces within the proposed new school building.
- 6.4 It is understood that some of the teaching spaces will be ventilated via a hybrid system (Hybrid units) and rest of the teaching and admin spaces will be ventilated by mechanical means (MVHR).

Overheating

- 6.5 The BB93 indoor ambient noise level criterion during overheating conditions in general teaching space while controlled by natural or hybrid ventilation is 55dB L_{Aeq,30min}. Based on the predicted external noise levels, this criterion is achievable at this site with windows open to provide additional ventilation / cooling.
- 6.6 This IANL is permitted during the hottest 200 hours in peak summertime conditions. The ventilation must be under the local control of the teacher so that the noise level can be reduced to normal levels when needed.

Building Façade Assessment

- 6.7 Given that natural ventilation via open windows is acceptable, there are no specific requirements for the acoustic performance of the building façade or glazing for majority of areas. Any glazing unit achieving a sound insulation performance of 26 dB R_w or greater would be sufficient, which is not an onerous requirement.
- 6.8 Standard thermal glazing with 4/TC/4mm (glass/air/glass) configuration is expected to achieve a sound insulation performance of 31 dB R_w .

Noise Ingress via External Wall and Glazing

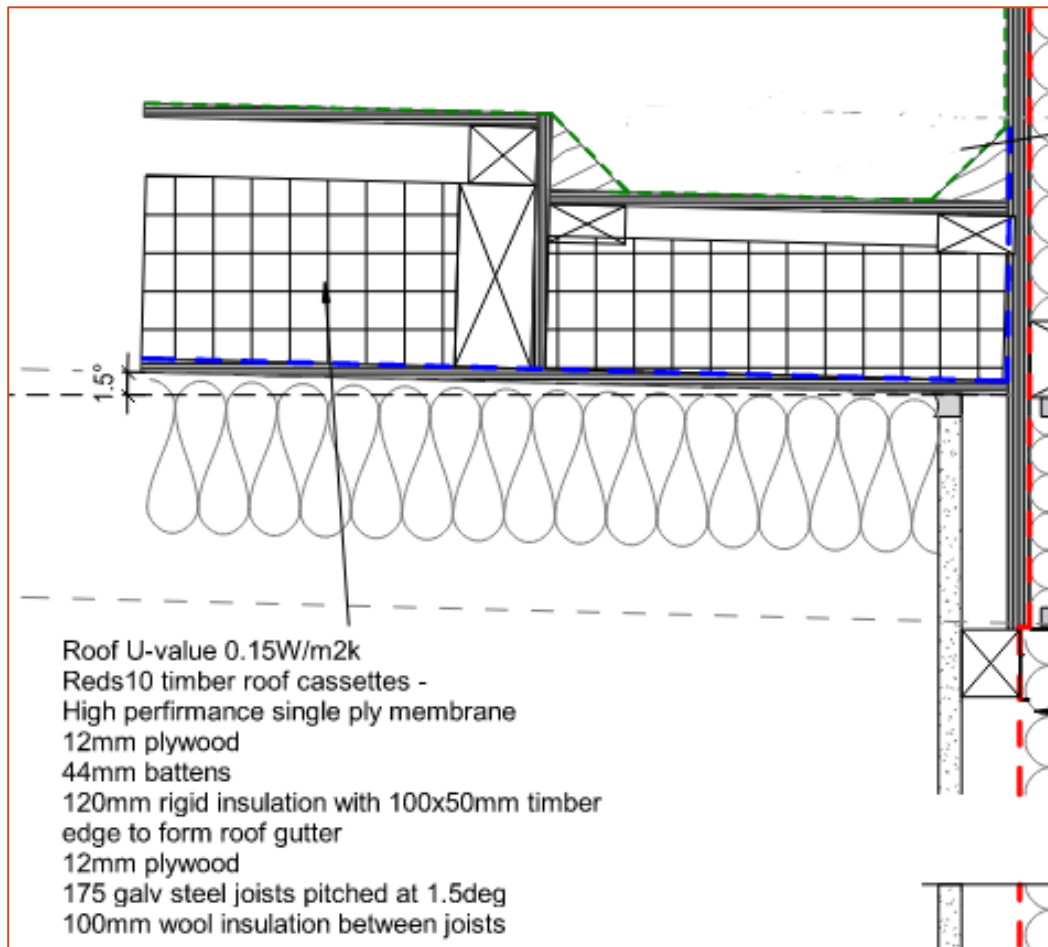
- 6.9 The proposed windows are understood to comprise of triple glazed construction, which would easily meet the required sound insulation performance.
- 6.10 The non-glazed element is expected to comprise of;
- Drylining + VCL (1x 15mm Plasterboard);
 - 38 x 44mm timber battens with 100mm mineral fibre insulation (min 150mm cavity);
 - Fibre cement cladding (minimum 8mm);
- 6.11 The above wall construction has a predicted sound insulation performance of at least 45 dB R_w and hence would easily meet the required sound insulation performance.
- 6.12 In order not to compromise the sound insulation performance of the external cladding, the passive operation mode of the hybrid units (louvre) would need to have an element-normalized sound level difference of $\geq 26 \text{ dB } D_{n,e,w} + 10 \log N$, where N is the number of elements per room. This will be reviewed once details are available.

Roof and Rain Noise

- 6.13 Consideration will need to be given to the control of rain noise impact for roofs. According to BB93, noise levels during heavy rain should not be more than 25 dB above the appropriate indoor ambient noise levels given in Table 1. Heavy rain noise excitation is defined in BS EN ISO 140-18¹.
- 6.14 BB93 requires that lightweight roofs are designed to provide suitable control of the reverberant sound pressure level within a space during heavy rainfall. It is intended that calculation should be provided; however, this is only possible where a manufacturer can provide laboratory test data for their roof. Where data is not available, the roof design should include specific measures designed to reduce rain noise impact.
- 6.15 The proposed roof build-up will comprise a multi-layer construction, with no available laboratory test data, as indicated in Figure 6, below.

¹ British Standards Institution (BSI) (2006): 'BS EN ISO 140-18:2006 Acoustics – Measurement of sound insulation in buildings and of building elements – Part 18: Laboratory measurement of sound generated by rainfall on building elements'. BSI.

Figure 6: Roof Construction within the Development



- 6.16 In the absence of laboratory test data for this roof construction, the rain noise impact level has been predicted in Insul, and used to calculate rain noise levels in a typical classroom.
- 6.17 The assessment indicates that the proposed roof construction is capable of controlling rainfall noise to meet the requirements of BB93. It should also be noted that this roof build up has been installed in previous Red 10 school projects, with no complaints from end users.
- 6.18 Where roof lights are proposed, these should be double glazed and not polycarbonate.
- 6.19 In terms of noise break-in, the above roof has a predicted airborne sound insulation performance of at least 45 dB R_w , and hence would be acceptable.

Noise from Mechanical Ventilation units

- 6.20 It is understood that classrooms will be ventilated via a hybrid system, with the remainder of the spaces ventilated by mechanical means (HRU).
- 6.21 It should be noted that the noise contribution from the mechanical system of hybrid units and MVHR units should not exceed the IANL criteria as presented in Table 1 above.
- 6.22 The cumulative noise contribution from hybrid units together with noise ingress through the building façade should not exceed the IANL criteria as presented in Table 1 above by more than 5dB for hybrid ventilation. The cumulative noise within each space due to building services should be therefore designed to a noise level no greater than the limits presented in Table 1.

7 BUILDING SERVICES NOISE EMISSIONS

- 7.1 Any externally mounted or discharging building services should be designed to avoid any adverse impact on the NSRs (Figure 1) when assessed in accordance with the guidance in BS 4142:2014 'Methods for Rating and Assessing Industrial and Commercial Sound'.
- 7.2 Further to communication with Giles Rawdon, Environmental Health Officer (Pollution), it is understood that HBBC has no formally adopted criteria for the control of building services noise emissions but would expect the plant noise rating level to be no higher than the existing background noise level, and ideally 5dB lower than this.
- 7.3 Based on the noise survey data, the background noise level measured during the daytime period (07:00-23:00h) at long-term noise monitoring location LT1 was 38dBL_{A90, T} and the background noise level measured during the night period (07:00-23:00h) was 35dBL_{A90, T}.
- 7.4 It is proposed that the plant noise rating level from building services affecting the surrounding noise sensitive receptors should be controlled to achieve a BS4142:2014 rating level L_{Ar, Tr} of no greater than the existing background noise level.
- 7.5 The design should seek to avoid acoustically distinctive features where reasonably practical.
- 7.6 ***On this basis, plant noise emissions should be controlled such as the rating level when assessed at the nearest noise sensitive receptor (Figure 1) is no higher than 38dBL_{Ar, Tr} during daytime (07:00h-23:00h) and 35dBL_{Ar, Tr} during the night time (23:00h-07:00h).***
- 7.7 The noise limits are to be met at 1m from the window of the identified NSRs (Figure1).

Proposed Plant

- 7.8 The proposed plant items with a contributing noise output are presented in Table 3. Typical noise details of the proposed plant are provided in Table 4. Appendix C of this report presents screenshots from manufacturers' noise data.

Table 3: Proposed Building Services Plant Items Exposed to NSR

Plant Item	Model Number	Location	Quantity
Air Source Heat Pumps - ASHP	Euroklimar Heera	External Plant Area - Roof	2
Hot water -Air Source Heat Pumps - ASHP	Ecoforest Geotermia-ecoAIR 3-18 PRO	External Plant Area - Roof	4
Heat Recovery Units, HRU-1118- 01,02, HRU-1119-01,02, HRU-3001 to HRU-3005, HRU-4001 to HRU4005, HRU-6001 to HRU-6004, HRU 5001 and HRU5010-1	Nuaire XBC15HAand XBC25HA	External Duct Terminals, multiple areas	17
Extract Fan, EF-6007 to 6011, 5001A,5103 and 6211	Nuaire- MEV ECO	External Duct Terminals, multiple areas	8
Extract Fan, EF-02-01 to 02-05	Nuaire	Roof	5

- 7.9 Table 4 below presents the basis of design sound power levels used for building service plant items.

Table 4: Sound Power Levels of the Plant Items

Plant Item		Sound Power Level dB _{LWA}
Air Source Heat Pumps - Euroklimar Heera		82dB _{LWA}
Hot Water Air Source Heat Pumps- ecoAIR 3-18 PRO		57dB _{LWA}
HRUs	Inlet	50-59dB _{LWA}
	Discharge	50-64dB _{LWA}
Extract Fan, EF-6007 to 6011, 5001A,5103 and 6211	Outlet	46dB _{LWA}
Science Fume Cupboard Fans, EF-02-01 to 02-05	Outlet	65dB _{LWA}

- 7.10 The above presented noise levels for HRUs and EFs at the duct terminals are considering various duct losses and the attenuator insertion losses presented in Appendix D.

Hours of Operation

- 7.11 It is understood that all building service plant items will be scheduled to operate during daytime (07:00-23:00h). It is understood that all building service plant items except science fume cupboard extract fans will operate during the night-time (23:00-07:00h).

BS4142 Assessment

- 7.12 The residential receptors overlooking Bradgate Gardens (Figure 1) is considered to be the worst affected noise sensitive property in terms of noise exposure from building service plant items.
- 7.13 Based on our experience of similar plant, and the manufacturer's data provided, it is considered very unlikely that noise emissions from the plant items would be tonal, therefore no correction for tonality has been applied. The hot water ASHP units' operation will be intermittent, which has been accounted for in the assessment.
- 7.14 In completing the calculations, corrections have been corrected for the attenuation of sound over distance, and source directivity, as appropriate.
- 7.15 The noise levels of the heat recovery units, extract fans have been corrected based on the proposed attenuation measures, which are detailed in Appendix D.
- 7.16 Table 5 below presents the BS4142 assessment of the plant selection at the proposed residential receptors (nearest receptors to external plant area, which is around 42m from the ASHP external roof plant area) for daytime (07:00h-23:00h) and night-time (23:00-07:00h).

Table 5: BS 4142 Assessment (NSR–Bradgate Gardens)

Item	Calculation	Relevant Clause	Comments
Measured background sound level - daytime	38dBL _{A90, 1hr}	8.3	The typical background sound level measured during the daytime period.
Measured background sound level – night-time	35dBL _{A90, 15min}	8.3	The typical background sound level measured during the night-time period.
Specific sound level	35dB L _{Aeq, T}	7.3.3	A prediction made using the methodology outlined above, includes all sources, screening and distance corrections.
Assessment made during the daytime and night-time periods so reference period is 1 hour and 15 minutes respectively		7.2	-
Acoustic Feature Correction	0 dB	9.2	No acoustic features are anticipated to the dominant sources.
Rating Level	35dBL _{Ar, Tr}	9.2	The predicted Rating Level during the daytime period.
Excess of Rating Level over background sound level - daytime	- 3 dB	11	-
Excess of Rating Level over background sound level -night-time	0dB	11	-
Assessment indicates low likelihood of adverse impact		11	Predicted Rating Level does not exceed the measured typical background level. This is an indication of the development having a low impact.
Uncertainty of the assessment	Moderate	10	Background sound level based on repeatable measurements made by others. The predicted Rating Level is based on established prediction methodologies.

7.17 It can be seen that the predicted plant noise rating level $L_{Ar,Tr}$ is 3dB lower than the background noise level L_{A90} measured during the daytime and equal to the existing background noise level L_{A90} measured during the night-time . This is an indication that the proposed plant will have a low impact at the nearest noise sensitive receptor. No further mitigation measures are therefore required.

8 EXTERNAL PLAY AREAS – SCHOOL USE DURING BREAK-TIMES

8.1 Based on the comments received from EHO, the noise model has been updated to include an assessment of noise impact from the external play areas on nearby sensitive receptors.

8.2 The nearest residential receptors are at approximately 25m to the north of the external play area at Bradgate Gardens/Olympic Gate, as illustrated on Figure 1 above.

Model Input

8.3 It is understood that as a worst-case, during good weather, the external play area may be used by 200-300 children during break and lunch times.

8.4 Based on ANSI 3.5, the sound power level of a 'normal' human voice is 68dBL_{WA}, 'raised' human voice is 76dBL_{WA} and 'shouted human' voice is 91dBL_{WA}.

8.5 For the purpose of this assessment, the following assumptions have been made;

- Around 100 pupils could use the external hard informal and other play areas simultaneously with a normal voice;
- Around 30 pupils could use the external hard informal and other play areas simultaneously with a raised voice;
- Around 30 pupils could use the external hard informal and other play areas simultaneously with a shouted voice;
- The residential receptors are assumed to have a 1.8m high solid garden fence.

8.6 Due to the size of the external play area, this has been modelled as an area source using Soundplan 9.0 to distribute this sound power evenly across the hard informal and other play areas.

8.7 The noise model has been updated to include screening from the garage blocks to the rear of the housing on Bradgate Gardens to allow a more accurate assessment.

Assessment Standards and Guidance

8.8 There is no specific guidance for assessing the noise from school playground use.

8.9 BS8233:2014 recommends that during the daytime, the noise level within residences should be no more than 35dBL_{Aeq,16hr}.

8.10 The WHO Guidelines for Community Noise discusses guideline values for noise in external amenity areas, noting that moderate annoyance may be expected at a noise level of 50dBL_{Aeq,16hr} and that serious annoyance may occur at a noise level of 55dBL_{Aeq,16hr}.

Existing Conditions

8.11 There is an existing school on the site and, whilst the existing play areas are located further from the residential receptors on Bradgate Gardens than will occur with the proposed development, noise from pupils at play does not represent the introduction of a new noise source in the context of the site and receptors.

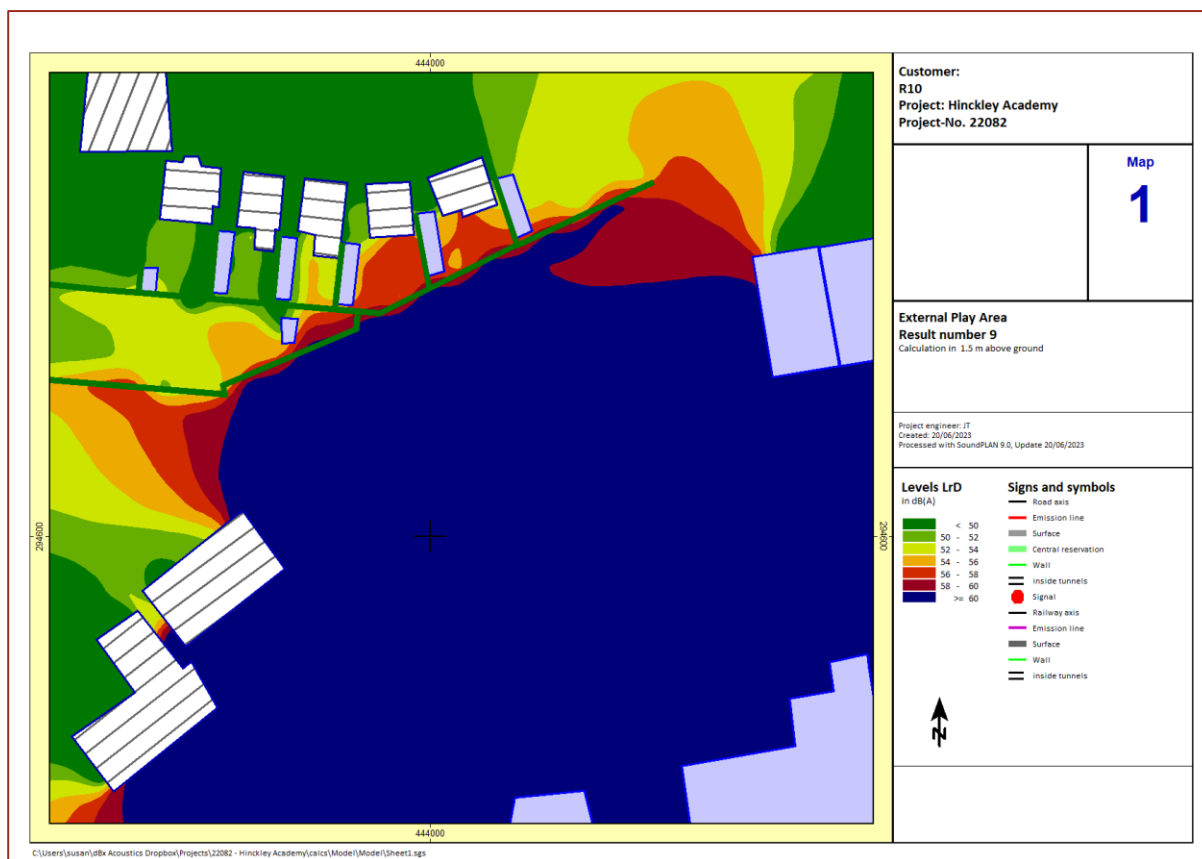
8.12 The noise levels measured by Tetra Tech at LT1 at the north of the site can be considered representative of the residential receptors. The 16-hour weekday daytime level was reported as 57dBL_{Aeq,16hours}. Therefore, conditions within the external amenity areas of the residential properties already marginally exceeds the recommendations of WHO.

- 8.13 Allowing a typical 13dB external to internal level difference through an open window, ambient noise levels within the houses as-existing would be in the order of 44dB_{L_{Aeq,16hours}} which is 9dB higher than the recommended levels for daytime amenity set in BS8233.

Predicted Plant Noise and Discussion

- 8.14 The model indicates that with the external play area in full use, the most-affected residential receptors on Bradgate Gardens would be subject to a noise level from play of up to 58dB_{L_{Aeq,T}}. This is 1dB above the measured ambient noise level during the daytime period. It can be seen from Figure 7, below, that this level occurs within the gardens of only two properties, with the noise level from play being typically below 54dB_{L_{Aeq,T}} for other premises.

Figure 7: Predicted Noise Levels Due to Playground Activity



- 8.15 With reference to the IEMA Guidelines for Environmental Noise Impact Assessment, there would be a short-term increase in cumulative noise levels of 3.5dB with the external areas in use. Based on Table 7-12 of the guidelines, this would be considered a 'slight' impact, but considered a non-intrusive effect. This is described in Table 7-7 of the guidelines as follows;

Noise impact can be heard, but does not cause any change in behaviour or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.

- 8.16 Noise levels arising from the anticipated most intensive usage of the external play areas at Hinckley Academy has been modelled using the Soundplan 9.0 software package.
- 8.17 As there is existing fencing to the residential properties which provides some acoustic screening, there is no practical further mitigation which can be incorporated within the scheme.

- 8.18 The predicted noise level arising due to use of the external areas as a worst-case is 1dB greater than the existing ambient noise level at the two most affected residential receptors. With reference to the IEMA Guidelines for Environmental Noise Impact Assessment this would not be considered to be a significant impact or to affect the quality of life of residents.

9 SUMMARY AND CONCLUSION

- 9.1 It is proposed to demolish an existing school block at the Hinckley Academy and John Cleveland Sixth Form College, Hinckley, LE10 1LE and replace with a new three-storey block. The Local Authority is Hinckley and Bosworth Borough Council (HBBC).
- 9.2 dBx Acoustics Ltd has been appointed by Reds10 (UK) Ltd. to undertake a noise impact assessment for the proposed School.
- 9.3 A noise survey was undertaken at the site by Tetra Tech to determine noise levels affecting the proposed development. Based on these measured noise levels, a noise model of the site has been created to undertake an assessment of the required building envelope sound insulation in order to meet indoor ambient noise levels set out in Building Bulletin 93.
- 9.4 Using the predicted incident noise levels, it has been determined that natural ventilation by means of openable windows will be appropriate for this site, and it is understood that hybrid/mechanical ventilation is proposed.
- 9.5 A BS4142 assessment has been carried out based on the measured background sound level by Tetra Tech. It is demonstrated that during day-time period and night-time period there is a low probability of adverse impact at noise sensitive receptors due to building services plant.
- 9.6 An indicative assessment has been undertaken to assess the activity noise from the sports pitches to nearby noise sensitive receptors. The predicted noise level arising due to use of the external areas as a worst-case is 1dB greater than the existing ambient noise level at the two most affected residential receptors. With reference to the IEMA Guidelines for Environmental Noise Impact Assessment this would not be considered to be a significant impact or to affect the quality of life of residents.
- 9.7 Taking the above into account, noise should not be a limiting factor in any planning application.

APPENDIX A – GLOSSARY OF ACOUSTIC TERMINOLOGY

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is 2×10^{-5} N/m ² . The sound pressure level existing when microphone measured pressure is 2×10^{-5} N/m ² is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p) or Sound Power Level (L_w).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A-weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
L_{Fmax}	The instantaneous maximum sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
L_{AFmax}	The instantaneous maximum A weighted sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
$L_{Ar,Tr}$	The rating level: the equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise.
Reverberation Time, T	The time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped. The descriptor T, often includes other nomenclature to describe the type of reverberation time measurement or if the reverberation time is an average taken for specific frequencies. For example, a T_{mf} is the mid-frequency reverberation time.
Absorption Coefficient, α	The fraction of reverberant sound energy absorbed by a material. It is expressed as a value between 1.0 which equates to perfect absorption and 0 which equates to zero absorption.
Acoustic Class, A - E	Classification of sound absorbers into Sound Absorption Classes A-E, according to BS EN ISO 11654, including frequencies 200-5000 Hz
NRC	A single-number rating system used to compare the sound-absorbing characteristics of building materials. A measurement of the acoustical absorption performance of a material, calculated by averaging its Sound Absorption Coefficients at 250, 500, 1000 and 2000 Hz
STI	Speech Transmission Index , Metric ranging between 0 and 1 representing the transmission quality of speech with respect to intelligibility by a speech transmission channel
R	Sound Reduction Index , the laboratory measured sound insulation properties of a material or building element in octave or third octave bands.
R_w	Weighted Sound Reduction Index , a single number which represents the sound reduction of a material. It is derived by plotting the sound reduction index against a set of reference curves. The curves are shifted until a best-fit is established and the curve which best fits the sound reduction spectrum is used to represent the single figure value.
D_w	Weighted Level Difference , the weighted level difference between a pair of rooms, stated as a single figure.

D_{nT}	Standardised Level Difference, a frequency-dependent measurement of airborne sound insulation, calculated using the following formula: $D_{nT} = L_1 - L_2 + 10\log(T/T_0)$ dB Where: L_1 is the energy-averaged sound pressure level due to the pink noise source measured in the source room using a sweep technique. L_2 is the energy-averaged sound pressure level measured in the receiving room using a sweep technique. T is the mean receiving room reverberation time (derived from T_{30} measured in seconds). T_0 is the reference reverberation time (= 0.5s for dwellings).
$D_{nT,w}$	Weighted Standardised Level Difference, a single-figure value of airborne sound insulation performance, derived according to procedures in BS EN ISO 717-1, based on the D_{nT} values at different frequencies (100-3150 Hz third octave bands).
$D_{n,F,w}$	Weighted, Normalised Flanking Level Difference, the normalised, weighted difference in sound level between a pair of rooms via a flanking element, such as mullion or ceiling detail. The level difference in octave bands is first normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
D_{ne}	Normalised Element Level Difference. The normalised difference in sound level between a pair of rooms via a small element such as a trickle ventilator. The level difference in octave bands is normalized to a reference amount of absorption.
$D_{n,e,w}$	Weighted, Normalised Element Level Difference. The normalised, weighted difference in sound level between a pair of rooms via a small element such as a trickle ventilator, stated as a single figure. The level difference in octave bands is normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
C_{tr}	Spectrum Adaptation Term, a correction term applied to the sound insulation single-number values (R_w, D_{wT}, and $D_{nT,w}$) in accordance with BS EN ISO 717-1. Applying the C_{tr} penalises a construction's performance if its low frequency performance is poor in relation its performance at higher frequencies.
Impact Sound	The noise generated by an impact on a structure. This is normally used to describe the noise created by people walking or moving furniture on a floor structure.
L_{nT}	Standardised Impact Sound Pressure Level, a frequency dependent measurement of impact sound insulation, calculated using the following formula: $L_{nT} = L_1 + 10\log(T/T_0)$ dB Where: L_1 is the mean sound pressure level due to the tapping machine measured in the receiving room using a sweep technique. T is the mean receiving room reverberation time (derived from T_{30} measured in seconds). T_0 is the reference reverberation time (0.5s for dwellings)
$L'_{nT,w}$	Weighted Standardised Impact Sound Pressure Level, a single-figure value (@ 500 Hz) of impact sound insulation, performance, derived according to BS EN ISO 717-2, based on the L_{nT} values at different frequencies (100Hz- 3150 Hz third octave bands).
Insertion Loss, IL	The reduction of noise level due to the presence of a noise control device such as an attenuator, excluding any regeneration noise created by its presence.
NR	The Noise Rating level. This is a single figure value derived by plotting a noise spectrum against a set of curves. The curve under which the spectrum fits is the resulting NR level.

APPENDIX B – NOISE SURVEY DATA- TETRA TECH REPORT

Table 2.1 Noise monitoring Locations

Ref	Description
LT1	Western part of the site, adjacent to site entrance road
ST1	Western part of the site, adjacent to the car park
ST2	West of the site, 68 Butt Lane
ST3	East of the site, between 98 and 108 Olympic Way
ST4	South-west of the site, 39 Woodland Road

Figure 2.1 Baseline Noise Monitoring Location Plan

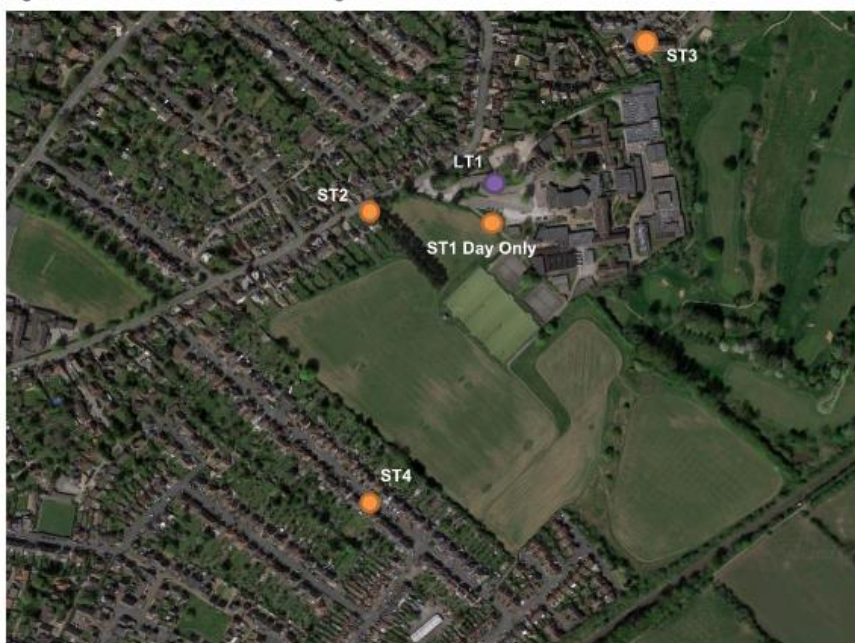


Table 2.3 Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	L _{Aeq,T} (dB)	L _{Amax,T} (dB)	L _{Amin,T} (dB)	L _{A16,T} (dB)	L _{A90,T} (dB)
Weekday Daytime 07:00 - 23:00	46 Hours	07/07/2021 – 12/07/2021 13:32 – 11:47	LT1	57.0	94.6	33.9	49.9	38
Weekday Night-time 23:00 – 07:00	24 hours	07/07/2021 – 12/07/2021 23:00 – 07:00		43.6	83.5	32.8	40.8	35
Weekend Daytime 07:00 - 23:00	32 Hours	10/07/2021 – 11/07/2021 07:00 – 23:00		46.9	90.9	34.5	45.9	40
Weekend Night-time 23:00 – 07:00	16 hours	10/07/2021 – 11/07/2021 23:00 – 07:00		42.2	84.8	33.5	41.0	36
Daytime 07:00 - 19:00	15 Mins	07/07/2021 13:39	ST1	47.8	64.1	39.9	50.1	42.3
	15 Mins	07/07/2021 15:02	ST2	63.4	93.8	38.3	65.0	43.1
	15 Mins	07/07/2021 14:41	ST3	42.3	57.3	32.6	45.9	34.7
	15 Mins	07/07/2021 15:20	ST4	59.7	74.2	33.2	64.8	38.0
	15 Mins	07/07/2021 13:54	ST1	50.4	72.8	40.4	49.6	43.0
	15 Mins	07/07/2021 16:01	ST2	60.9	85.8	39.8	60.2	43.2
	15 Mins	07/07/2021 15:42	ST3	45.2	67.4	35.9	47.4	39.0
	15 Mins	07/07/2021 16:17	ST4	60.3	77.4	35.8	64.1	40.3
Evening 19:00 - 23:00	15 Mins	07/07/2021 22:43	ST2	54.2	75.9	34.8	51.7	36.5
	15 Mins	07/07/2021 22:16	ST3	31.8	40.4	27.2	33.6	29.5
	15 Mins	07/07/2021 21:50	ST4	47.0	73.5	28.3	36.8	30.4
Night-time 23:00 - 07:00	15 Mins	07/07/2021 23:55	ST2	43.0	75.2	31.4	38.8	33.9
	15 Mins	07/07/2021 23:35	ST3	45.5	59.5	29.0	49.1	30.9
	15 Mins	07/07/2021 23:02	ST4	49.0	72.7	31.4	49.0	34.1

All values are sound pressure levels in dB re: 2x 10⁻⁵ Pa

APPENDIX C – MANUFACTURERS’ NOISE DATA

Air Source Heat Pumps (ASHP)

Single fan sound spectrum (dB(A))									
SOUND POWER	L _W (A)	63	125	250	500	1000	2000	4000	8000
	72	42	57	65	67	69	68	61	55

Total fans sound spectrum (dB(A))									
SOUND POWER	L _W (A)	63	125	250	500	1000	2000	4000	8000
	78.0	48.0	63.0	71.0	73.0	75.0	72.0	67.0	61.0

SOUND PRESSURE @1m free field	
	59.1 dB(A)

SOUND PRESSURE @10m free field	
	46.0 dB(A)

SOUND PRESSURE a @ 5.0 m free field	
	50.9 dB(A)

Single compressor sound spectrum (dB(A))									
SOUND POWER	L _W (A)	63	125	250	500	1000	2000	4000	8000
	77.4	57.3	58.1	66.6	63.5	65.6	66.3	64.2	50

Total compressors sound spectrum (dB(A))									
SOUND POWER	L _W (A)	63	125	250	500	1000	2000	4000	8000
	80.4	60.3	62.1	69.6	66.5	68.9	71.3	67.2	53.0

SOUND PRESSURE @1m free field	
	61.5 dB(A)

SOUND PRESSURE @10m free field	
	48.4 dB(A)

SOUND PRESSURE a @ 5.0 m free field	
	53.3 dB(A)

Single unit sound spectrum (dB(A))									
SOUND POWER	L _W (A)	63	125	250	500	1000	2000	4000	8000
	82.4	60.6	65.6	73.4	73.9	76.0	74.7	70.3	61.7

Fans Quantity: 4

Unit dimensions
L 3370.0 mm
W 2100.0 mm
H 1985.0 mm

EK EUROKLIMAT
Cooling System Solutions

Compressors quantity: 2

% correction factor for vibration and flow rate: 0%

Final correction: 0

UNIT FINAL CALCULATION	
TOTAL sound power	82.4 dB(A)
SOUND PRESSURE @1m free field	63.4 dB(A)
SOUND PRESSURE @10m free field	50.3 dB(A)
SOUND PRESSURE a @ 5.0 m free field	55.2 dB(A)

Hot Water Air Source Heat Pumps (ASHP)



CEN heat pump
KEYMARK

Page 3 of 15

This information was generated by the HP KEYMARK database on 25 Feb 2023

EN 12102-1		
	Low temperature	Medium temperature
Sound power level indoor	0 dB(A)	0 dB(A)
Sound power level outdoor	57 dB(A)	57 dB(A)

Heat Recovery Units (HRU)

HRU- 6001, 6002, 6003, 6004

Sound Data									
Noise calculated speed controlled to required duty (35.03%)									
Sound Power Levels re 1 pWatts (Hz):									
Hz	63	125	250	500	1k	2k	4k	8k	dB(A)
Open Inlet	45	43	43	37	37	30	23	<16	
Open Outlet	39	52	57	56	52	49	38	<16	
Breakout	44	42	41	35	29	26	20	<16	<16

HRU- 1118-01, 1118-02,1119-01, 1119-02**Sound Data**

Noise calculated speed controlled to required duty (70.61%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Breakout	64	63	50	53	40	39	39	31	32
Induct Intake	72	66	64	66	61	57	49	48	45
Induct Supply	77	78	73	77	67	67	63	65	56
Induct Discharge	78	79	73	76	67	67	65	66	55
Induct Extract	71	65	63	66	60	57	49	49	45

HRU- 4002**Sound Data**

Noise calculated speed controlled to required duty (55.45%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Breakout	59	58	45	48	35	34	34	26	27
Induct Intake	67	61	59	61	56	52	44	43	40
Induct Supply	72	73	68	72	62	62	58	60	50
Induct Discharge	73	74	68	71	62	62	60	61	50
Induct Extract	66	60	58	61	55	52	44	44	40

HRU- 5010-01**Sound Data**

Noise calculated speed controlled to required duty (68.33%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Breakout	52	48	33	34	32	28	25	<16	17
Induct Intake	61	51	46	47	53	46	38	34	34
Induct Supply	66	63	56	57	59	55	50	48	42
Induct Discharge	66	64	56	58	59	56	51	49	42
Induct Extract	60	50	46	46	52	46	36	32	33

HRU- 4005**Sound Data**

Noise calculated speed controlled to required duty (57.36%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Breakout	59	58	45	48	35	34	34	26	27
Induct Intake	67	61	59	61	56	52	44	43	41
Induct Supply	72	73	68	72	62	62	58	60	51
Induct Discharge	73	74	68	71	62	62	60	61	51
Induct Extract	66	60	58	61	55	52	44	44	41

HRU- 3003, 4001**Sound Data**

Noise calculated speed controlled to required duty (53.94%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Breakout	58	57	44	47	34	33	33	25	26
Induct Intake	66	60	58	60	55	51	43	42	40
Induct Supply	71	72	67	71	61	61	57	59	50
Induct Discharge	72	73	67	70	61	61	59	60	49
Induct Extract	65	59	57	60	54	51	43	43	39

HRU-4004**Sound Data**

Noise calculated speed controlled to required duty (51.85%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Breakout	57	56	43	46	33	32	32	24	25
Induct Intake	65	59	57	59	54	50	42	41	39
Induct Supply	70	71	66	70	60	60	56	58	49
Induct Discharge	71	72	66	69	60	60	58	59	49
Induct Extract	64	58	56	59	53	50	42	42	38

HRU-3001**Sound Data**

Noise calculated speed controlled to required duty (46.46%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Breakout	55	54	41	44	31	30	30	22	23
Induct Intake	63	57	55	57	52	48	40	39	36
Induct Supply	68	69	64	68	58	58	54	56	46
Induct Discharge	69	70	64	67	58	58	56	57	46
Induct Extract	62	56	54	57	51	48	40	40	36

HRU-3004**Sound Data**

Noise calculated speed controlled to required duty (58.2%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Breakout	49	45	30	31	29	25	22	<16	<16
Induct Intake	58	48	43	44	50	43	35	31	30
Induct Supply	63	60	53	54	56	52	47	45	38
Induct Discharge	63	61	53	55	56	53	48	46	39
Induct Extract	57	47	43	43	49	43	33	29	30

HRU-5001**Sound Data**

Noise calculated speed controlled to required duty (59.5%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Breakout	60	59	46	49	36	35	35	27	28
Induct Intake	68	62	60	62	57	53	45	44	42
Induct Supply	73	74	69	73	63	63	59	61	52
Induct Discharge	74	75	69	72	63	63	61	62	52
Induct Extract	67	61	59	62	56	53	45	45	41

Extract Fans (EF)**EF-6008, EF-6009, EF-6010 & EF-6011****Sound Data**

Noise calculated speed controlled to required duty (35.03%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Open Inlet	45	43	43	37	37	30	23	<16	
Open Outlet	39	52	57	56	52	49	38	<16	
Breakout	44	42	41	35	29	26	20	<16	<16

EF-5103**Sound Data**

Noise calculated speed controlled to required duty (31.01%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Open Inlet	45	42	42	35	36	29	23	<16	
Open Outlet	39	52	56	55	52	48	37	<16	
Breakout	44	42	40	34	28	25	20	<16	<16

EF-6007**Sound Data**

Noise calculated speed controlled to required duty (37.59%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Open Inlet	45	44	45	40	40	33	26	17	
Open Outlet	39	53	58	57	53	50	39	18	
Breakout	44	43	43	37	31	28	21	<16	18

EF-6211

Sound Data

Noise calculated speed controlled to required duty (42.67%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Open Inlet	45	46	48	43	43	37	29	20	
Open Outlet	40	54	59	58	55	51	41	21	
Breakout	44	44	45	40	33	31	23	16	20

EF-5001

Sound Data

Acoustic performance to ISO 13347 and AMCA 300.

Noise calculated speed controlled to required duty (65.09%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Induct Inlet	66	62	55	52	44	42	43	42	
Induct Outlet	71	63	61	51	47	48	44	43	
Breakout	52	46	42	35	27	26	23	20	20

Science Fume Cupboard Extract Fans

Sound Data													Maximum airflow temperature: 50°C	
Speed	Qv	SP	LwA	LpA *	Octave band (Hz)									
RPM	(m³/h)	(Pa)	dB(A)	dB(A)	63	125	250	500	1000	2000	4000	8000		
1450	1330	322	78	57	100	81	81	75	69	61	58	53		

APPENDIX D – SOUND ATTENUATOR INSERTION LOSS DETAILS

Heat Recovery Unit Attenuators– Atmospheric Side

XBC25-HE-MBS-S

At all volumes -2 -4 -8 -16 -29 -22 -14 -10

XBC25-HS-MBS-L

At all volumes -2 -5 -10 -21 -38 -25 -17 -13

XBC25-HS-MS12

At all volumes -7 -10 -18 -36 -51 -39 -26 -20

XBC25-HE-MS12

At all volumes -5 -6 -12 -27 -34 -20 -13 -9

XBC25-HS-MS12

At all volumes -7 -10 -18 -36 -51 -39 -26 -20

XBC25-HE-MS12

At all volumes -5 -6 -12 -27 -34 -20 -13 -9

Please note that the noise data stated on this data sheet for the unit and/or silencer is tested in accordance with UK, European and International industry laboratory standards. However onsite conditions may vary and we would recommend that this information is verified by an acoustic specialist in order to ensure its suitability for the intended application.

Selected Ancillaries

2 x XBC25-HS-MS12	Double-skinned Silencer, Supply or Discharge side, 1250mm length
2 x XBC25-HE-MS12	Double-skinned Silencer, Extract or Intake side, 1250mm length
1 x ESCO-TS	Ecosmart Connect temperature sensor

XBC15-HS-MS12

At all volumes -7 -13 -16 -26 -35 -34 -27 -21

XBC15-HE-MS12

At all volumes -4 -4 -7 -17 -25 -16 -9 -5

Please note that the noise data stated on this data sheet for the unit and/or silencer is tested in accordance with UK, European and International industry laboratory standards. However onsite conditions may vary and we would recommend that this information is verified by an acoustic specialist in order to ensure its suitability for the intended application.

Selected Ancillaries

2 x XBC15-HS-MS12	Double-skinned Silencer, Supply or Discharge side, 1250mm length
2 x XBC15-HE-MS12	Double-skinned Silencer, Extract or Intake side, 1250mm length

Extract Fan Attenuator– Atmospheric Side

Table 6: Induct Silencer Requirements- -Atmospheric Side- EFs

System	Minimum Insertion Loss (dB) at each Octave Band Centre Frequency (Hz)							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Extract Fans -Atmospheric Side	-3	-5	-9	-13	-15	-16	-11	-9

Note: The above values can typically be achieved with a 600mm long 40% free area attenuator.

Science Fume Cupboard Extract Fan Attenuator – Atmospheric Side

Table 7: Induct Silencer Requirements- -Atmospheric Side-

System	Minimum Insertion Loss (dB) at each Octave Band Centre Frequency (Hz)							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Science Fume Cupboard Fans	-4	-9	-17	-26	-31	-30	-23	-16

Note: The above values can typically be achieved with a 1200mm long 40% free area attenuator.

This report (including any enclosures and attachments) has been prepared by dBx Acoustics with reasonable skill and care in accordance with generally accepted acoustic principles and the terms agreed between dBx Acoustics and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by dBx Acoustics unless expressly stated otherwise. This document contains confidential information, and no part of this report should be reproduced, distributed or communicated to any third party without express prior written consent from dBx Acoustics. We do not accept any liability if this report is used for an alternative purpose from that for which it is intended, nor to any third party in respect of this report. Where a noise survey has been undertaken, this report is based on the noise climate at the site at the time of the survey and no warranty is given as to the possibility of changes at differing times.

Registered Office: Beehive Mill, Jersey Street, Manchester M4 6JG

Registered in England and Wales, Company Number 08371474



SPL0001-DBX-XX-XX-T-J-0001 Noise Impact Assessment Report-R02C

Final Audit Report

2023-07-03

Created:	2023-07-03
By:	Susan Witterick (susan@dbxacoustics.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAArrbmZfO6RoNXC3v9_SUMIaEecm3AqRc6

"SPL0001-DBX-XX-XX-T-J-0001 Noise Impact Assessment Report-R02C" History

 Document created by Susan Witterick (susan@dbxacoustics.com)

2023-07-03 - 11:21:35 AM GMT

 Document emailed to joseph@dbxacoustics.com for signature

2023-07-03 - 11:21:50 AM GMT

 Email viewed by joseph@dbxacoustics.com

2023-07-03 - 11:26:00 AM GMT

 Signer joseph@dbxacoustics.com entered name at signing as Joseph Tony

2023-07-03 - 11:26:19 AM GMT

 Document e-signed by Joseph Tony (joseph@dbxacoustics.com)

Signature Date: 2023-07-03 - 11:26:21 AM GMT - Time Source: server

 Agreement completed.

2023-07-03 - 11:26:21 AM GMT