

Project: Mannson House, 104 Oxford Road, RG1 7LL
Client: Royal Meteorological Society (RMetS)

Date: 28/02/2021
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Project:	Mannson House, 104 Oxford Road, RG1 7LL		
Client:	Royal Meteorological Society (RMetS)		
Report Title:	Environmental Noise Survey and Plant Assessment		
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Presentational Conventions

The provisions of this report is presented in upright type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material is presented in italic text, and does not constitute a normative element.

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1 Introduction

Paragon Acoustic Consultants Ltd has been commissioned to conduct an environmental noise survey to obtain statistical noise data to characterise the existing local background and ambient noise climate at the site and to derive noise limits to atmosphere based on Local Authority Noise Policy and other relevant guideline documents.

This information shall be used assess the proposed new mechanical plant installation, in the context of Local Authority Noise policy.

If deemed necessary, effective mitigation measures shall be introduced.

This practice has been advised that the operational period of the proposed mechanical plant maybe 24 hours.

2 Site Description

The application site is situated at 104 Oxford Road, located within the town of Reading. It is a Grade II listed building, that is occupied by the Royal Meteorological Society.

The surrounding area comprises premises with a range of uses; notably commercial and retail, however residential dwellings are also proximal to the site.

Situated to the west, is the Centre for Health and Disability Assessments, whilst immediately to the north is the Crown Prosecution service premises with a frontage on Eaton Place.

Residential premises are located on Eaton Place, immediately to the south of the Chatham Place Qpark, at a remove of approximately 18m from the northeast corner of the site.

The nearest residential dwelling is taken to be the first floor level premises above the Saood Pharmacy approximately 13m distant from the site.

Directly opposite the site to the east, is a single storey commercial premises currently occupied by the Accommodation Centre.

A site location drawing is shown in Figure 1.

Figure 1: Site Location



3 Existing Noise Climate

3.1 Road Traffic

Road traffic noise from the Oxford Road forms a major component of the ambient noise climate at site. Due to the fact the survey was carried out during a national lockdown as a result of COVID-19, traffic flows would be lower than would otherwise be the case. However, it should be noted that a reduction in traffic volume of 20% would only cause a 1 dB reduction in noise levels and as a consequence ambient sound levels are no considered to be significantly in error.

3.2 Rail Traffic

Due to the fact the site is not situated close to any railway lines, rail traffic noise was not observed during the manned period at the start and end of the survey.

3.3 Aircraft

Aircraft overflights were not observed during the survey period. Although it is likely that the noise levels measured will include contributions from medium and high-altitude aircraft.

3.4 Mechanical Noise Sources

No noise from mechanical plant was perceptible during the site attendances. Any contribution from the third-party mechanical plant to the background sound climate is taken to be from sources that are legitimately in use.

4 Environmental Noise Survey

4.1 Measurements

The noise monitoring took place between the following dates / times:

- Start: 05/02/2021 at 10:00 hours
- End: 09/02/2021 at 10:00 hours

The noise monitoring was generally un-manned and was undertaken at the location as described below.

- MP1: East elevation of the RMetS building, 3rd floor level, 1 metre from façade.

The measurement location is illustrated in Figure 2 below.

Figure 2: Measurement Position



Various statistical broad-band and spectral sound pressure level measurements were obtained during the survey. A measurement time interval $T_m = 15$ minutes was used for sampling. Measurements of the percentile level $L_{A90,T}$ were made using time weighting F as per clause 3.4 of BS 4142:2014.

The quantities recorded included:

- $L_{Aeq,T}$: the equivalent continuous A-weighted sound pressure level over the measurement period, T ;

- L_{AFmax} : the maximum A-weighted sound pressure level for the measurement period, T ;
- $L_{A10,T}$: the A-weighted sound pressure level exceeded for 10% of the measurement period, T ;
- $L_{A90,T}$: the A-weighted sound pressure level exceeded for 90% of the measurement period, T .

4.2 Weather during Survey Period

Representative weather data for the survey period is summarised as follows:

Table 1: Summary of typical weather conditions during survey period

Day and Date	Temperature		Average Humidity	Average Pressure	Average Wind Speed
	Max	Min			
05/02/2021	8°C	5°C	92%	1007 hPa	3.4 m/s
06/02/2021	6°C	-3°C	95%	1006 hPa	2.4 m/s
07/02/2021	3°C	0°C	80%	1005 hPa	9.5 m/s
08/02/2021	0°C	-1°C	80%	1004 hPa	7.1 m/s
09/02/2021	-1°C	-4°C	89%	1006 hPa	3.3 m/s

4.3 Instrumentation

The following instrumentation and equipment was used during the survey:

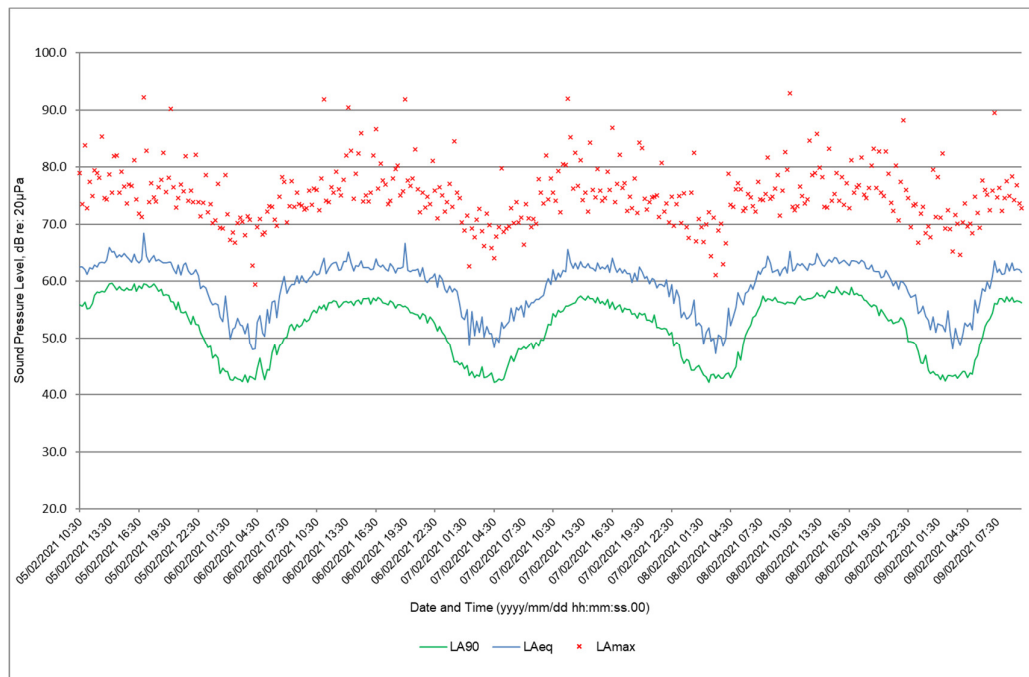
Type	Serial Number	Calibration Certificate	Calibration Due Date
Norsonic Real Time Analyser Type NOR118	31322	U31799	15/05/2021
Norsonic Microphone Type 1225	72929	U31798	15/05/2021
Norsonic Calibrator Type NOR1251	31080	U31797	15/05/2021
Norsonic Pre-amplifier Type NOR1206	30366	U31799	15/05/2021
Norsonic Weather Protection Kit	n/a	n/a	n/a

Field calibration checks were made using a calibrator meeting Class 1 of IEC 60942 at the beginning and end of the survey. No significant drift was encountered, calibration level $114.0 \text{ dB} \pm 0.2 \text{ dB} @ 1.0 \text{ kHz} \pm 0.2\%$.

4.4 Results

The recorded survey data is shown within Appendix A. Broadband sound pressure level data over the survey period ($L_{A90,T}$ background sound levels, ambient $L_{Aeq,T}$ and maximum L_{AFmax} sound levels) are shown as a time series in Figure 3 below:

Figure 3: Sound level time series



The lowest daytime, evening and night-time background sound levels obtained are summarised below:

Table 2: Lowest background sound levels

Measurement Position	Daytime 07:00-19:00 $L_{A90,(15\text{ min})}$	Night-time 23:00-07:00 $L_{A90,(15\text{ min})}$
MP1 – RMetS Building	48 dB	42 dB

5 Evaluation of External Noise Criteria

The local vicinity contains properties of mixed usage, which must be given due consideration in terms of acceptable levels of noise exposure from the new plant.

5.1 Noise Sensitive Receptors

It is necessary to consider the requirements of the Local Planning Authority Reading Borough Council. In their memo dated 21st May 2019 in respect of 190647 – Pre-application advice, the following policy requirements were set out in respect of noise sensitive receptors:

Applications which include noise generating plant when there are nearby noise sensitive receptors should be accompanied by an acoustic assessment carried out in accordance with BS4142:2014 methodology.

Our draft noise policy states for proposed new plant:

The noise source specific noise level (plant noise level) should be at least 10dBA below the existing background level as measured at the nearest noise sensitive receptor and the rating level should not exceed the background level (as measured in accordance with BS4142:2014).

Within Reading there is strong justification for requiring the plant specific noise level to be at least -10dB below the measured background level. Specifically to prevent cumulative impact from addition of plant over time which could result in background creeping up to levels which might cause adverse health impact, which is more likely in a densely occupied town such as Reading. Levels of -10dB ensure that the background level is not increased and nuisance is unlikely.

However, there may be some situations where this cannot be achieved there may be some flexibility where this is justifiable for example where there are very low background noise levels, etc.

The foregoing policy makes explicit reference to BS 4142:2014¹. Subclause 1.1. of the standard restricts assessment of outdoor sound levels to people who might be inside or outside a dwelling or room for residential purposes.

It is therefore reasonable to categorise only these types of premises as sensitive receptors for the purposes of implementing Reading Borough Council policy.

5.2 Commercial Properties

In addition to sensitive receptors, it is also necessary to gauge sound levels at other types of premises such as non-domestic buildings. Guidelines for these types of premises are provided in BS 8233:2014.

¹ BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound supersedes BS 4142:2014 which is withdrawn.

Table 3: Typical noise levels in non-domestic buildings (source: BS 8233:2014, Table 6)

Activity	Location	Design range dB $L_{Aeq, T}$
Speech or telephone communications	Department store Cafeteria, canteen, kitchen	50 - 55
	Concourse Corridor, circulation space	45 - 55
Study and work requiring concentration	Library, gallery, museum	40 - 50
	Staff/meeting room, training room	35 - 45
	Executive office	35 - 40
Listening	Place of worship, counselling, meditation, relaxation	30 - 35

Table 4: Indoor ambient noise levels in spaces when they are unoccupied and privacy is also important (source: BS 8233:2014, Table 2)

Objective	Typical situations	Design range $L_{Aeq, T}$ dB
Typical noise levels for acoustic privacy in spaces	Restaurant	40 - 55
	Open plan office	45 - 50
	Night club, public house	40 - 45
	Ballroom, banqueting	35 - 40
	Living room	35 - 40

NOTE See Noise control in building services [28] and BS EN ISO 3382.

It is reasonable to consider a noise criterion external to commercial premises that takes account of the internal design range, plus the loss expected through an openable window.

In a research study conducted for DEFRA NANR116: "Open/Closed Window Research", numerous references are provided which quantify losses through open and partially open windows:

Table 5: DEFRA NANR16 summary of findings

Information Source	Summary of Findings
PPG 24 (1994) ^[2]	A reduction of 13 dB(A) from the facade level is assumed for an open window
WHO (1999) ^[4]	A reduction of 15 dB from the facade level is assumed for a partially open window. (no reference)
BS 8233 (1999) ^[5]	Windows providing rapid ventilation and summer cooling are assumed to provide 10 - 15 dB attenuation (no specific reference)
BRE Digest 338 (1988) ^[6]	A partly open window has an averaged level difference, $D_{1m,av100-3150}$ of 15 dB
DoE Design Bulletin 26 (1972) ^[7]	A reduction of 5 dB(A) with a window wide open
Nelson - Transportation Noise (1987) ^[8]	Sound insulation of an open single window is 5 – 15 dB. (theoretical)
Mackenzie & Williamson DoE Report (1972–73) ^{[9],[10]}	A vertical sliding sash window open 0.027 m ² (summer night-time ventilation) and 0.36 m ² (daytime summer ventilation) provided a sound level reduction of 16 and 11 dB(A) respectively. (Lab Study)
Kerry and Ford (1973 – 74) ^{[11],[12]}	A horizontal sliding sash window open 25 mm and 200 mm provided averaged sound reduction indices, R_{av} of 14 and 9 dB respectively. (Field Study)
Lawrence and Burgess (1982 – 83) ^{[13],[14]}	A vertical sliding sash open 9% of the total façade provided a sound reduction index R_w 10 dB. (Field study)
Hopkins (2004) ^[15]	Road traffic noise reductions through window openings resulted in reductions of between $D_{2m,n,T}$ 8 and 14 dB. (Field Study)

Table 1.1 Summary of open-window acoustic transmission literature

The findings of the study are referenced in this report to substantiate the use of a 13dB(A) loss through a partially open window.

5.3 External Noise Criteria

The derived external noise criteria which the new building services plant shall be required to achieve are shown below:

Table 6: Limiting noise criteria applicable at affected premises

Plant Location	Receptor	Daytime 07:00-23:00		Night-time 23:00-07:00	
		$L_{Aeq,T}$	$L_{Ar,T}$	$L_{Aeq,T}$	$L_{Ar,T}$
Any new plant on site See Sections 2 and 6	Noise Sensitive Receptors	38 dB	48 dB	32 dB	42 dB
	Commercial premises	53 dB	n/a	53 dB	n/a
General note: It is taken that the noise Criteria apply at the surrounding third-party premises. Noise levels may be exceeded external to windows of the client's premises					

6.2 Predicted Plant Noise Levels

Calculations have been carried out using the data presented earlier within this report to predict the resultant sound pressure levels due to airborne transmitted noise outside the nearest exposed noise assessment position, and corresponding to the quietest period of plant operation. The predicted results are summarised below, with example calculation sheets included in Appendix B for reference:

Table 7: Predicted noise levels at nearest affected premises

Plant under consideration	Assessment location	Approx. distance to receiver	Line of sight?	Predicted $L_{Aeq,Tf}$	Derived noise limit	
					Day	Night
3 × Panasonic CU-5Z90TBE	CPS Office	2m	Yes	57 dB	53 dB	n/a
	Mayer House, Chatham Place	20m	No [1]	39 dB	38 dB	32 dB
	Saood Pharmacy	13m	No [1]	43 dB	38 dB	32 dB
Notes						
[1] No direct line of sight from plant to receptor, however multiple image sources will occur due to reflected sound between plane parallel surfaces of RMetS property and CPS building						

It can be seen that:

- For affected third party noise sensitive properties, the proposed plant will not meet the derived noise limits during both the day and night periods;
- For affected third party commercial properties, the proposed plant will not maintain the derived noise limit.

6.3 Noise Mitigation Requirements to Plant

An acoustic enclosure(s) shall be used to house the condenser units. The enclosure shall have suitably ventilated and attenuated airways and provide attenuation to all directions including to below. A specialist supplier shall provide a fit for purpose acoustic enclosure to provide the following minimum acoustic performance:

Table 8: Minimum insertion loss requirements for enclosure in all directions

Quantity	1/1 octave band centre frequency, Hz							
	63	125	250	500	1k0	2k0	4k0	8k0
Minimum insertion loss (dB)	0	1	8	15	16	15	12	5

The insertion loss is hereby defined as the difference in sound pressure level with and without the enclosure in place. In order for this potential reduction in acoustic performance to be evaluated, the chosen enclosure supplier shall submit their product acoustic test data to Paragon Acoustic Consultants Limited prior to procurement / manufacture.

Test data shall be provided for all of the proposed hardware products used in the construction of the enclosure and shall be obtained from an independent UKAS

accredited test laboratory to provide proof that the foregoing acoustic performance will be maintained.

The dimensions of the enclosure are to be determined by the noise mitigation hardware supplier and agreed with the client.

Paragon Acoustic Consultants has considered the acoustic performance of the enclosure. The introduction of this type of structure has implications in other areas of design. As such, the client shall employ the services of other specialists to take responsibility for other areas of design associated with the introduction of such a structure. The following list is provided as an example of other areas to be considered as a minimum:

Airflow to and from condensing units: The installation of an enclosure will restrict the airflow around the condensing units. This will potentially give rise to two adverse effects as follows:

- The resistance to airflow will increase
- Heated discharge air from the condenser coils may re-circulate back into the condenser coils

The supplier of close fitting enclosure and the mechanical services consultant shall guarantee that their enclosures shall not adversely affect the performance of condensing units.

Structural: A suitably qualified consultant shall assess all structural loading as necessary.

Aesthetics: The visual appearance of the enclosures is to be agreed by the client's architect. The architect shall also consider all necessary statutory approvals and address design issues not covered by the relevant specialist consultant.

Alteration to existing services: The installation of each enclosure may require alteration to certain of the existing mechanical and electrical services in the vicinity of the proposed enclosure. In addition, the condensing units may require to be moved into close fitting enclosures. The client shall co-ordinate any such works.

Delivery and installation access: The enclosure supplier shall make appropriate arrangements for the delivery and installation of enclosures, including equipment such as cranes and scaffolding requirements.

Guarantees: The client shall obtain the necessary guarantees that the enclosure will meet the minimum insertion loss requirements as specified by this practice in the foregoing section. In addition, the client shall obtain all other guarantees as required.

Maintenance/repair/replacement: The enclosures shall allow maintenance / repair / replacement of the condensing unit equipment enclosed.

Warrantees: The client shall ensure that the warrantees provided by the condensing unit supplier/manufacture are not invalidated by the introduction of the noise mitigation works.

Submission of final enclosure designs: The final design of the enclosures shall be submitted to Paragon Acoustic Consultants for comment prior to manufacture.

6.4 Vibration

It is recommended that the client provisions for appropriate vibration isolation mountings for the proposed mechanical plant items. It is recommended that the plant be installed on vibration isolation mounts providing a minimum of 98% isolation efficiency at all forcing

frequencies using an isolation mount system approved by the plant supplier. In addition, all pipework should be suitably isolated from the building structure.

6.5 Example Product Type

An acoustic enclosure type capable of meeting the acoustic performance indicated in Table 8 is the Unity Acoustic Enclosure System produced by Environ Group, product details of which are given over to appendix C.

6.6 Predicted Plant Noise Levels with Mitigation

Calculations have been carried out to predict the noise levels at the nearest exposed noise assessment position including the insertion loss values of the noise mitigation identified in Table 8. The predicted results are summarised below:

Table 9: Predicted noise levels with mitigation at nearest affected premises

Plant under consideration	Assessment location	Approx. distance to receiver	Line of sight?	Predicted $L_{Aeq,Tr}$	Derived noise limit	
					Day	Night
3 × Panasonic CU-5Z90TBE	CPS Office	2m	Yes	45 dB	53 dB	n/a
	Mayer House, Chatham Place	20m	No [1]	27 dB	38 dB	32 dB
	Saood Pharmacy	13m	No [1]	31 dB	38 dB	32 dB
Notes						
[1] No direct line of sight from plant to receptor, however multiple image sources will occur due to reflected sound between plane parallel surfaces of RMetS property and CPS building						

It can be seen that the proposed plant, together with the noise mitigation measures detailed, **would** maintain the Local Authority $L_{Aeq,Tr}$ policy requirement for third party noise sensitive properties, and also for third party commercial properties.

Given that the plant is to be mitigated, it is considered that acoustic features would not be present at the assessment locations and therefore the target rating levels ($L_{Ar,Tr}$) identified in Table 6 would be achieved de-facto.

Example calculation sheets included in Appendix B for reference.

7 Conclusions

A background noise survey has been undertaken to determine the noise climate likely to exist in locality of 104 Oxford Road, Reading, where the installation of new mechanical plant is proposed.

Appropriate external criteria have been identified on the basis of Local Authority noise policy, and predictions of the proposed mechanical plant noise emissions have been undertaken. Predictions indicate that the noise mitigation measures will be required in order to meet with the derived noise limits and a specification for the noise mitigation measures has been provided herein.

Following implementation and achievement of the noise mitigation recommended, it is predicted that its noise emissions will meet the existing noise policy implemented by Reading Borough Council. On this basis, reservations are not expected from the planning authority on the grounds of noise.

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Appendix A: Measurement Data

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1st day	LAF(max)	LAeq	L10	L90	2nd day	LAF(max)	LAeq	L10	L90
00:00	0.0	0.0	0.0	0.0	07:00	78.2	59.6	60.8	49.1
00:00	0.0	0.0	0.0	0.0	07:15	77.4	60.8	61.3	50.0
00:00	0.0	0.0	0.0	0.0	07:30	70.4	57.9	61.0	50.2
00:00	0.0	0.0	0.0	0.0	07:45	73.1	58.9	62.9	52.1
00:00	0.0	0.0	0.0	0.0	08:00	77.6	59.5	62.0	52.5
00:00	0.0	0.0	0.0	0.0	08:15	73.0	59.4	62.6	51.4
00:00	0.0	0.0	0.0	0.0	08:30	75.5	61.0	65.5	52.5
00:00	0.0	0.0	0.0	0.0	08:45	73.6	59.7	63.3	52.0
00:00	0.0	0.0	0.0	0.0	09:00	73.2	61.0	64.7	52.3
00:00	0.0	0.0	0.0	0.0	09:15	72.6	60.1	63.6	53.4
00:00	0.0	0.0	0.0	0.0	09:30	72.8	59.8	63.0	52.9
00:00	0.0	0.0	0.0	0.0	09:45	75.9	60.5	64.2	53.3
00:00	0.0	0.0	0.0	0.0	10:00	73.4	61.0	65.1	54.5
00:00	0.0	0.0	0.0	0.0	10:15	76.3	61.8	65.4	54.9
10:30	79.0	62.5	66.1	55.9	10:30	76.0	61.1	64.8	54.5
10:45	73.5	62.5	66.6	55.7	10:45	72.5	61.3	64.8	55.6
11:00	83.8	62.1	65.3	56.4	11:00	78.0	62.7	66.2	55.2
11:15	72.9	61.3	65.0	55.2	11:15	91.9	64.1	65.4	55.9
11:30	77.4	62.4	65.5	55.3	11:30	74.1	61.3	65.0	54.9
11:45	74.9	62.2	65.9	56.1	11:45	73.9	62.3	66.1	56.2
12:00	79.5	62.9	65.8	57.5	12:00	76.5	63.0	66.7	56.2
12:15	79.0	62.5	65.3	58.1	12:15	75.6	63.2	66.9	56.6
12:30	78.2	63.2	66.5	58.0	12:30	79.2	63.3	66.5	56.5
12:45	85.3	63.3	65.6	58.3	12:45	76.1	61.9	65.8	55.4
13:00	74.6	63.2	66.4	58.1	13:00	75.0	62.1	65.5	55.8
13:15	74.4	63.7	66.6	58.7	13:15	77.8	63.4	66.9	56.3
13:30	78.8	65.9	69.5	59.5	13:30	82.1	63.4	66.8	56.5
13:45	75.5	65.1	68.2	59.7	13:45	90.4	65.1	66.0	56.2
14:00	81.9	65.2	68.5	59.2	14:00	82.9	63.2	66.4	56.5
14:15	82.0	64.2	67.5	58.5	14:15	74.5	61.8	65.3	55.8
14:30	75.6	64.6	67.8	59.1	14:30	78.8	62.8	66.2	56.5
14:45	79.2	64.3	67.3	58.6	14:45	82.5	62.6	66.0	56.7
15:00	76.7	64.8	68.4	58.4	15:00	86.0	63.6	65.3	56.0
15:15	73.6	64.3	67.8	58.8	15:15	74.0	62.4	65.8	57.0
15:30	76.9	64.0	67.3	58.5	15:30	75.0	62.4	66.0	57.0
15:45	76.7	63.4	66.8	58.5	15:45	74.0	62.4	65.9	57.1
16:00	81.2	64.8	67.9	59.6	16:00	75.5	62.0	65.2	56.0
16:15	74.3	63.7	66.9	58.3	16:15	82.1	62.2	64.9	57.1
16:30	71.9	63.2	66.2	59.2	16:30	86.6	64.0	65.6	56.6
16:45	71.3	63.8	67.2	58.7	16:45	76.3	62.9	66.2	57.2
17:00	92.2	68.4	67.5	59.5	17:00	80.7	62.5	65.8	56.8
17:15	82.9	64.5	67.3	59.4	17:15	77.7	62.9	66.2	56.2
17:30	73.8	63.4	66.4	59.0	17:30	77.0	62.1	65.5	56.1
17:45	77.1	63.9	67.3	59.1	17:45	73.6	61.8	65.3	55.9
18:00	74.7	64.5	67.9	59.5	18:00	74.1	63.1	66.9	56.6
18:15	74.0	63.6	66.5	59.1	18:15	78.1	62.5	66.2	56.2
18:30	76.5	63.8	67.0	58.3	18:30	79.7	61.4	64.9	55.3
18:45	77.8	63.4	66.8	58.6	18:45	80.2	62.2	65.4	55.9
19:00	82.6	63.2	66.5	57.5	19:00	75.1	62.3	65.4	55.9
19:15	75.7	63.3	66.8	57.6	19:15	75.7	62.5	66.2	55.5
19:30	78.1	63.3	66.8	57.5	19:30	91.9	66.6	66.0	55.6
19:45	90.3	63.4	65.5	56.5	19:45	77.6	61.9	65.5	55.3
20:00	76.5	62.2	65.5	56.3	20:00	76.7	61.7	65.6	54.5
20:15	72.9	61.3	64.9	55.1	20:15	78.0	61.9	65.5	54.5
20:30	74.6	62.8	66.7	56.3	20:30	83.1	61.9	65.2	54.2
20:45	77.0	61.1	64.8	54.6	20:45	76.1	62.2	66.0	54.1
21:00	75.7	62.8	66.8	54.5	21:00	72.1	60.8	64.8	53.4
21:15	82.0	63.2	66.6	54.7	21:15	75.6	62.3	66.2	54.3
21:30	74.1	61.8	65.7	53.5	21:30	72.9	60.1	63.5	54.0
21:45	75.9	61.2	65.1	52.5	21:45	74.8	59.8	63.0	52.7
22:00	73.8	61.4	65.7	53.9	22:00	73.6	60.5	63.7	53.7
22:15	82.2	62.0	65.4	52.5	22:15	81.1	60.7	64.4	53.1
22:30	73.9	60.9	64.9	52.3	22:30	75.9	61.3	64.8	52.6
22:45	71.4	58.7	62.6	51.0	22:45	71.1	58.9	62.4	51.3
23:00	73.7	59.2	62.9	50.1	23:00	76.5	61.1	65.2	52.1
23:15	78.6	58.9	63.5	49.1	23:15	75.0	60.4	64.0	51.0
23:30	72.1	57.8	62.0	48.3	23:30	72.3	58.6	61.9	50.4
23:45	73.5	56.5	59.5	48.5	23:45	73.8	58.0	61.1	49.5
00:00	70.2	55.9	58.3	46.4	00:00	77.1	59.2	61.7	48.9
00:15	70.7	56.1	59.1	47.0	00:15	73.0	58.1	61.1	47.1
00:30	77.1	55.9	57.4	46.4	00:30	84.6	58.7	58.0	45.7
00:45	69.4	53.7	55.6	43.7	00:45	75.5	58.2	60.0	45.8
01:00	69.2	52.9	54.2	44.6	01:00	74.6	55.9	58.7	45.2
01:15	78.6	57.4	57.8	44.0	01:15	70.3	53.7	55.9	45.6
01:30	71.8	54.1	55.8	44.0	01:30	68.9	53.3	54.8	44.5
01:45	67.2	49.8	51.8	42.6	01:45	71.5	55.1	57.0	45.1
02:00	68.6	51.6	52.7	42.5	02:00	62.7	48.7	52.1	43.3
02:15	66.8	51.8	53.5	43.1	02:15	69.3	54.7	57.1	44.0
02:30	70.2	53.5	53.7	42.7	02:30	67.7	50.5	52.6	43.0
02:45	71.2	52.3	53.9	42.6	02:45	70.8	53.0	53.9	43.5
03:00	70.4	52.3	52.9	42.3	03:00	72.7	51.0	51.7	43.2
03:15	68.1	50.7	52.5	43.5	03:15	68.8	53.8	56.4	44.9
03:30	71.4	52.6	52.8	42.2	03:30	66.2	50.2	52.8	43.0
03:45	70.8	49.2	50.6	43.2	03:45	71.8	52.1	53.9	43.1
04:00	62.7	48.0	50.4	43.0	04:00	69.8	50.8	52.9	43.5
04:15	59.5	48.1	50.9	42.6	04:15	65.8	50.8	52.5	43.8
04:30	69.5	52.8	55.6	44.5	04:30	64.1	48.3	51.3	42.2
04:45	70.9	54.0	54.8	46.4	04:45	67.8	50.1	51.8	42.3
05:00	68.2	50.9	53.0	44.0	05:00	69.6	49.3	51.2	42.7
05:15	68.6	50.4	52.7	42.6	05:15	79.8	52.8	53.3	42.5
05:30	72.2	55.1	54.8	44.4	05:30	68.6	51.7	53.4	42.7
05:45	73.2	52.7	53.7	44.3	05:45	69.2	52.4	53.9	44.3
06:00	73.1	56.4	59.2	47.3	06:00	69.6	53.0	54.8	45.7
06:15	70.8	56.6	59.0	48.8	06:15	72.8	55.3	57.3	46.8
06:30	69.7	53.7	55.1	47.0	06:30	70.2	53.0	55.0	45.8
06:45	74.8	57.4	60.0	48.5	06:45	73.92	55.40	56.50	47.10

Project: Mannson House, 104 Oxford Road, RG1 7LL
Client: Royal Meteorological Society (RMetS)

Date: 28/02/2021
Reference: 20210228_4773_ENS01.docx

3rd day	LAF(max)	LAeq	L10	L90
07:00	70.3	55.0	57.5	48.1
07:15	71.2	55.8	58.2	48.0
07:30	66.4	53.8	55.9	48.4
07:45	73.5	56.6	59.1	48.1
08:00	71.0	55.4	57.5	48.6
08:15	69.5	56.2	59.1	49.1
08:30	70.9	56.2	58.8	48.1
08:45	70.0	56.8	59.9	49.2
09:00	77.9	56.9	59.1	48.5
09:15	75.6	57.2	59.7	49.7
09:30	73.6	57.6	60.4	49.6
09:45	82.1	59.6	62.7	51.1
10:00	74.3	60.5	64.5	52.4
10:15	78.0	59.4	62.9	52.3
10:30	75.6	62.1	66.4	54.4
10:45	74.2	60.1	63.9	53.8
11:00	79.4	61.4	64.1	54.9
11:15	72.1	60.7	64.1	54.6
11:30	80.5	61.9	64.5	54.8
11:45	80.3	61.7	64.9	55.7
12:00	92.0	65.6	66.1	55.7
12:15	85.3	63.4	65.8	55.9
12:30	76.3	62.3	65.4	56.1
12:45	82.5	63.3	66.4	56.2
13:00	76.7	62.1	65.5	57.1
13:15	81.3	63.5	66.3	57.4
13:30	74.2	62.7	66.4	57.1
13:45	75.6	62.4	65.7	56.7
14:00	72.2	63.1	66.6	57.4
14:15	84.3	62.4	65.4	56.9
14:30	76.0	62.2	65.5	57.0
14:45	74.7	61.8	64.9	56.2
15:00	79.6	63.2	66.8	57.2
15:15	75.9	62.2	65.9	56.1
15:30	74.1	62.5	66.0	56.5
15:45	74.6	62.2	65.6	55.9
16:00	79.2	62.9	65.8	56.8
16:15	76.1	61.6	64.8	55.3
16:30	86.9	64.0	65.8	56.4
16:45	73.9	62.4	66.4	55.0
17:00	77.0	61.5	65.2	55.5
17:15	82.2	62.3	65.0	55.9
17:30	76.3	61.4	65.1	54.6
17:45	77.2	62.0	64.9	55.3
18:00	72.3	61.3	65.1	55.0
18:15	74.8	61.3	64.5	55.0
18:30	72.8	59.8	63.3	54.2
18:45	78.0	61.4	64.8	54.4
19:00	72.0	60.0	63.7	53.5
19:15	84.3	62.5	66.2	54.5
19:30	83.4	61.7	65.0	54.1
19:45	74.4	60.5	64.1	54.4
20:00	72.5	60.8	65.0	53.1
20:15	73.8	59.6	63.0	53.1
20:30	74.7	60.5	64.0	52.8
20:45	74.9	60.3	63.6	54.1
21:00	75.1	58.8	61.4	51.8
21:15	71.3	59.4	63.5	51.9
21:30	80.8	59.4	61.7	51.6
21:45	72.2	59.1	62.4	51.7
22:00	73.7	60.3	64.4	51.6
22:15	70.3	57.4	60.6	50.5
22:30	74.8	59.5	63.5	51.0
22:45	69.7	56.1	59.5	48.6
23:00	73.6	58.5	61.9	49.2
23:15	75.0	57.2	59.3	48.8
23:30	70.2	53.6	56.0	46.6
23:45	75.4	54.6	55.8	45.5
00:00	69.5	53.4	55.8	46.2
00:15	67.6	53.6	57.0	45.9
00:30	75.5	54.4	53.3	44.3
00:45	82.5	56.7	54.7	44.3
01:00	67.0	52.2	54.1	44.8
01:15	70.9	52.6	54.1	45.1
01:30	69.5	52.1	53.3	44.2
01:45	66.9	48.9	50.9	43.5
02:00	70.0	51.0	52.1	43.1
02:15	72.1	51.9	51.0	42.2
02:30	64.4	49.4	52.0	43.5
02:45	71.2	50.0	51.0	43.6
03:00	61.1	47.3	50.0	42.8
03:15	68.9	50.5	52.7	43.4
03:30	70.0	50.2	51.8	42.8
03:45	63.0	48.5	51.4	42.8
04:00	66.7	49.9	52.7	43.6
04:15	78.8	55.2	52.8	43.8
04:30	73.4	52.2	52.9	43.0
04:45	73.0	53.7	54.3	44.0
05:00	76.2	55.4	55.4	44.9
05:15	77.2	58.0	60.9	47.5
05:30	76.2	56.8	57.1	46.0
05:45	72.3	55.9	57.3	49.0
06:00	72.8	57.9	59.9	50.4
06:15	75.3	58.2	60.9	51.5
06:30	74.7	59.5	61.7	52.3
06:45	73.1	58.6	60.6	53.6

4th day	LAF(max)	LAeq	L10	L90
07:00	72.3	60.0	63.4	54.0
07:15	77.4	61.8	65.3	55.0
07:30	74.4	61.2	64.3	55.8
07:45	74.2	62.3	65.7	57.4
08:00	75.3	62.5	66.1	56.5
08:15	81.7	64.4	67.7	57.0
08:30	74.5	63.2	67.0	56.8
08:45	74.8	61.6	64.6	56.6
09:00	76.2	61.8	64.7	57.2
09:15	78.6	62.0	65.4	56.3
09:30	71.5	60.9	63.8	56.4
09:45	75.8	62.0	65.2	56.2
10:00	82.7	62.5	65.9	56.0
10:15	79.5	61.5	64.2	56.4
10:30	92.9	65.2	65.6	56.2
10:45	73.1	61.8	65.1	56.2
11:00	72.5	62.0	65.5	56.0
11:15	73.1	63.1	66.8	57.0
11:30	76.6	62.8	65.8	57.4
11:45	74.9	63.1	66.7	56.8
12:00	73.7	62.5	65.8	56.7
12:15	74.3	61.9	65.1	57.0
12:30	84.6	63.2	65.7	56.9
12:45	78.6	62.9	66.1	57.1
13:00	79.0	63.1	66.0	57.4
13:15	85.8	64.8	67.7	58.0
13:30	79.9	63.8	67.3	57.4
13:45	78.3	62.9	66.1	57.5
14:00	73.0	62.7	66.1	57.1
14:15	73.0	63.3	66.9	58.0
14:30	83.2	63.8	67.1	58.4
14:45	74.1	63.3	66.7	58.0
15:00	75.3	64.2	67.6	58.0
15:15	79.0	64.0	66.8	59.1
15:30	74.1	63.1	66.1	58.2
15:45	78.3	63.4	66.6	57.7
16:00	73.4	63.7	67.2	58.3
16:15	77.2	63.2	66.5	58.0
16:30	72.8	62.7	66.0	57.6
16:45	81.2	63.6	66.8	58.9
17:00	75.5	63.5	66.9	57.6
17:15	76.5	63.5	67.2	57.9
17:30	76.9	63.2	66.2	57.5
17:45	81.6	63.7	67.1	57.5
18:00	75.1	63.3	66.8	56.7
18:15	74.6	62.2	65.7	56.6
18:30	76.3	62.1	65.6	56.0
18:45	80.2	62.8	65.9	55.5
19:00	83.2	61.8	64.8	55.9
19:15	76.4	61.7	65.1	55.7
19:30	82.8	61.7	64.1	54.0
19:45	75.6	60.7	64.4	55.0
20:00	75.0	60.8	64.5	54.3
20:15	82.8	62.0	65.2	53.7
20:30	78.9	61.1	65.0	53.0
20:45	73.8	60.2	63.8	53.3
21:00	72.3	59.2	62.9	52.6
21:15	80.2	60.1	63.3	52.8
21:30	70.7	58.6	62.1	52.9
21:45	77.4	60.0	63.3	53.6
22:00	88.3	59.8	62.0	53.2
22:15	76.0	59.1	61.5	51.7
22:30	74.6	58.1	61.9	49.4
22:45	69.5	57.2	61.2	49.4
23:00	73.3	57.5	61.0	49.3
23:15	73.5	57.7	60.8	48.9
23:30	66.7	54.4	57.6	47.6
23:45	71.9	54.9	57.6	45.6
00:00	73.1	55.6	57.9	45.5
00:15	68.5	53.8	56.3	46.9
00:30	69.7	53.2	54.5	44.3
00:45	67.8	51.5	53.7	43.7
01:00	79.6	53.7	54.9	44.0
01:15	71.3	51.0	52.4	43.4
01:30	78.2	52.5	55.1	43.5
01:45	71.1	52.3	51.4	42.6
02:00	82.3	52.2	51.3	43.4
02:15	69.3	51.2	52.0	42.4
02:30	72.5	54.8	54.8	43.3
02:45	69.1	51.4	53.2	43.3
03:00	65.3	48.1	50.1	43.2
03:15	71.7	51.8	51.5	43.5
03:30	70.1	50.2	50.6	42.8
03:45	64.6	48.7	50.9	43.4
04:00	70.3	50.7	51.1	44.1
04:15	73.6	52.6	53.6	44.1
04:30	69.6	52.1	53.0	43.0
04:45	70.1	52.7	53.2	43.8
05:00	68.5	51.5	53.1	43.6
05:15	74.8	56.7	59.2	46.0
05:30	72.0	54.4	54.9	46.9
05:45	69.3	56.1	58.8	48.8
06:00	77.7	58.7	61.6	50.1
06:15	76.0	58.3	60.5	52.1
06:30	75.2	59.9	63.5	52.8
06:45	72.4	58.8	61.1	53.4

Date: 28/02/2021
Reference: 20210228 4773 ENS01.docx

[illegible]

Project: Mannson House, 104 Oxford Road, RG1 7LL
Client: Royal Meteorological Society (RMetS)

Date: 28/02/2021
Reference: 20210228_4773_ENS01.docx

Appendix B: Calculation Sheets

project	RMetS, Oxford Road, reading								
date	28/02/2021								
Plant	Outdoor Unit - Cooling Mode								
Frequency	63	125	250	500	1000	2000	4000	8000	dB(A)
Enter the noise source	3 × Panasonic CU-5Z90TBE to CPS Office								
known / estimated sound power level	61	59	58	58	55	51	46	37	59.8
Q correction	4								
Distance (m)	2	Distance from source to receiver/source to lightwell boundary (m)							
Light well width (m)	13	(m)							
Light well depth (m)	3	(m)							
Light well height (m)	5	(m)							
Estimated rev time to use (s)*	0.7	(s)							
Number of sources of same lw	3	(at the same distance)							
Calculated sound pressure level at receiver	57.8	55.8	54.8	54.8	51.8	47.8	42.8	33.8	56.6
Direct sound pressure level calculated	54.4	52.4	51.4	51.4	48.4	44.4	39.4	30.4	53.2
Rev sound pressure level calculated	55.2	53.2	52.2	52.2	49.2	45.2	40.2	31.2	53.9
<i>A weighted total calculated sound pressure level at receiver</i>	<i>31.8</i>	<i>39.8</i>	<i>45.8</i>	<i>51.8</i>	<i>51.8</i>	<i>48.8</i>	<i>43.8</i>	<i>32.8</i>	
Insertion loss to lw	0	1	8	15	16	15	12	5	
Calculated Lp after insertion loss	57.8	55.2	46.5	39.8	36.0	32.8	30.5	28.7	44.5

Project: Mannson House, 104 Oxford Road, RG1 7LL
Client: Royal Meteorological Society (RMetS)

Date: 28/02/2021
Reference: 20210228_4773_ENS01.docx

project	RMetS, Oxford Road, reading								
date	28/02/2021								
Plant	Outdoor Unit - Cooling Mode								
Frequency	63	125	250	500	1000	2000	4000	8000	dB(A)
Enter the noise source	3 x Panasonic CU-5Z90TBE to Chatham Place Res								
known / estimated sound power level	61	59	58	58	55	51	46	37	59.8
Q correction	4								
Distance (m)	3	Distance from source to receiver/source to lightwell boundary (m)							
Light well width (m)	13	(m)							
Light well depth (m)	3	(m)							
Light well height (m)	5	(m)							
Estimated rev time to use (s)*	0.7	(s)							
Number of sources of same lw	3	(at the same distance)							
Calculated Lp at Lightwell boundary	56.5	54.5	53.5	53.5	50.5	46.5	41.5	32.5	55.3
Direct sound pressure level calculated	50.9	48.9	47.9	47.9	44.9	40.9	35.9	26.9	49.7
Rev sound pressure level calculated	55.2	53.2	52.2	52.2	49.2	45.2	40.2	31.2	53.9
Distance from Lightwell boundary to receptor	20								
Calculated Lp at receiver (before mitigation)	40.1	38.1	37.1	37.1	34.1	30.1	25.1	16.1	38.8
Insertion loss to lw	0	1	8	15	16	15	12	5	
Calculated Lp after insertion loss	40.1	37.4	28.7	22.0	18.3	15.1	12.7	10.9	26.8

Project: Mannson House, 104 Oxford Road, RG1 7LL
Client: Royal Meteorological Society (RMetS)

Date: 28/02/2021
Reference: 20210228_4773_ENS01.docx

project	RMetS, Oxford Road, reading								
date	28/02/2021								
Plant	Outdoor Unit - Cooling Mode								
Frequency	63	125	250	500	1000	2000	4000	8000	dB(A)
Enter the noise source	3 × Panasonic CU-5Z90TBE to Saood Pharmacy Res								
known / estimated sound power level	61	59	58	58	55	51	46	37	59.8
Q correction	4								
Distance (m)	3	Distance from source to receiver/source to lightwell boundary (m)							
Light well width (m)	13	(m)							
Light well depth (m)	3	(m)							
Light well height (m)	5	(m)							
Estimated rev time to use (s)*	0.7	(s)							
Number of sources of same lw	3	(at the same distance)							
Calculated Lp at Lightwell boundary	56.5	54.5	53.5	53.5	50.5	46.5	41.5	32.5	55.3
Direct sound pressure level calculated	50.9	48.9	47.9	47.9	44.9	40.9	35.9	26.9	49.7
Rev sound pressure level calculated	55.2	53.2	52.2	52.2	49.2	45.2	40.2	31.2	53.9
Distance from Lightwell boundary to receptor	13								
Calculated Lp at receiver (before mitigation)	43.8	41.8	40.8	40.8	37.8	33.8	28.8	19.8	42.6
Insertion loss to lw	0	1	8	15	16	15	12	5	
Calculated Lp after insertion loss	43.8	41.1	32.5	25.8	22.0	18.8	16.5	14.7	30.5

Project: Mannson House, 104 Oxford Road, RG1 7LL
Client: Royal Meteorological Society (RMetS)

Date: 28/02/2021
Reference: 20210228_4773_ENS01.docx

project	RMetS, Oxford Road, reading									
date	28/02/2021									
Plant	Outdoor Unit - Heating Mode									
Frequency	63	125	250	500	1000	2000	4000	8000	dB(A)	
Enter the noise source	3 x Panasonic CU-5Z90TBE to CPS Office									
known / estimated sound power level	58	61	58	58	55	51	44	36	59.7	
Q correction	4									
Distance (m)	2	Distance from source to receiver/source to lightwell boundary (m)								
Light well width (m)	13	(m)								
Light well depth (m)	3	(m)								
Light well height (m)	5	(m)								
Estimated rev time to use (s)*	0.7	(s)								
Number of sources of same lw	3	(at the same distance)								
Calculated Lp at Lightwell boundary	54.8	57.8	54.8	54.8	51.8	47.8	40.8	32.8	56.5	
Direct sound pressure level calculated	51.4	54.4	51.4	51.4	48.4	44.4	37.4	29.4	53.1	
Rev sound pressure level calculated	52.2	55.2	52.2	52.2	49.2	45.2	38.2	30.2	53.9	
Insertion loss	0	1	8	15	16	15	12	5		
Calculated Lp after insertion loss	54.8	57.2	46.5	39.8	36.0	32.8	28.5	27.7	45.0	

Project: Mannson House, 104 Oxford Road, RG1 7LL
Client: Royal Meteorological Society (RMetS)

Date: 28/02/2021
Reference: 20210228_4773_ENS01.docx

project	RMetS, Oxford Road, reading								
date	28/02/2021								
Plant	Outdoor Unit - Heating Mode								
Frequency	63	125	250	500	1000	2000	4000	8000	dB(A)
Enter the noise source	3 x Panasonic CU-5Z90TBE to Chatham Place Res								
known / estimated sound power level	58	61	58	58	55	51	44	36	59.7
Q correction	4								
Distance (m)	3	Distance from source to receiver/source to lightwell boundary (m)							
Light well width (m)	13	(m)							
Light well depth (m)	3	(m)							
Light well height (m)	5	(m)							
Estimated rev time to use (s)*	0.7	(s)							
Number of sources of same lw	3	(at the same distance)							
Calculated Lp at Lightwell boundary	53.5	56.5	53.5	53.5	50.5	46.5	39.5	31.5	55.3
Direct sound pressure level calculated	47.9	50.9	47.9	47.9	44.9	40.9	33.9	25.9	49.6
Rev sound pressure level calculated	52.2	55.2	52.2	52.2	49.2	45.2	38.2	30.2	53.9
Distance from Lightwell boundary to receptor	20								
Calculated Lp at receiver (before mitigation)	37.1	40.1	37.1	37.1	34.1	30.1	23.1	15.1	38.8
Insertion loss to lw	0	1	8	15	16	15	12	5	
Calculated Lp after insertion loss	37.1	39.4	28.7	22.0	18.3	15.1	10.7	9.9	27.3

Project: Mannson House, 104 Oxford Road, RG1 7LL
Client: Royal Meteorological Society (RMetS)

Date: 28/02/2021
Reference: 20210228_4773_ENS01.docx

project	RMetS, Oxford Road, reading								
date	28/02/2021								
Plant	Outdoor Unit - Heating Mode								
Frequency	63	125	250	500	1000	2000	4000	8000	dB(A)
Enter the noise source	3 × Panasonic CU-5Z90TBE to Saood Pharmacy Res								
known / estimated sound power level	58	61	58	58	55	51	44	36	59.7
Q correction	4								
Distance (m)	3	Distance from source to receiver/source to lightwell boundary (m)							
Light well width (m)	13	(m)							
Light well depth (m)	3	(m)							
Light well height (m)	5	(m)							
Estimated rev time to use (s)*	0.7	(s)							
Number of sources of same lw	3	(at the same distance)							
Calculated Lp at Lightwell boundary	53.5	56.5	53.5	53.5	50.5	46.5	39.5	31.5	55.3
Direct sound pressure level calculated	47.9	50.9	47.9	47.9	44.9	40.9	33.9	25.9	49.6
Rev sound pressure level calculated	52.2	55.2	52.2	52.2	49.2	45.2	38.2	30.2	53.9
Distance from Lightwell boundary to receptor	13								
Calculated Lp at receiver (before mitigation)	40.8	43.8	40.8	40.8	37.8	33.8	26.8	18.8	42.5
Insertion loss to lw	0	1	8	15	16	15	12	5	
Calculated Lp after insertion loss	40.8	43.1	32.5	25.8	22.0	18.8	14.5	13.7	31.0

Project: Mannson House, 104 Oxford Road, RG1 7LL
Client: Royal Meteorological Society (RMetS)

Date: 28/02/2021
Reference: 20210228_4773_ENS01.docx

Appendix C: Product Literature



UNITY ACOUSTIC ENCLOSURE

OPERATING AND MAINTENANCE MANUAL

Version – August 2020

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SITE DETAILS

Client: SWP Ltd
Site Location: 10 Belgrave Square - London

SITE SPECIFIC ENCLOSURE DETAILS

1# Unity Enclosure: EG-U11-ME8
4# Unity Enclosure: EG-U11-ME1

ENVIRON GROUP - UNITY ACOUSTIC ENCLOSURE SYSTEM

Environ Group Unity acoustic enclosure systems normally contain Air Source Heat Pumps, AC Plant, Refrigeration plant or air cooled condensers/chillers. Designed to allow plant items to be operated in noise sensitive areas without the need for further noise attenuation measures, the additional benefits – unobtrusive appearance and the opportunity to locate in public areas - has led to wide acceptance of the product range as an effective method of controlling noise. The Unity enclosure is designed to meet the air flow requirements of the plant whilst providing exceptional noise attenuation

ENCLOSURE DESIGN

The acoustic enclosure is designed to DIN ISO 8015 standards

Air flow is paramount in the design of acoustic solutions for ASHP/AC/Refrigeration plant items – without sufficient air the plant will not work efficiently or effectively. Equally important is that air recirculation within the enclosure must be avoided so as to maintain operational integrity – Air On to the plant has to be at ambient temperature

Environ Group Unity enclosures are designed with air flow in mind by providing internal plenum and septum panels to separate the air flows, on and off the plant. Constricting air flow is also a negative as the plant fans cannot cope with additional static pressure, so Unity designs are based on maximizing air flow within the enclosure design

All Unity enclosures are supplied with Anti Vibration Mounts to help mitigate vibration transmission to the building structure. All internal plenum panels have rubber gasket interface with the plant item to stop any metal to metal contact and provide air tight seals

ASHP and AC Plant operating in Heating Mode produce Condensate Water, this can be up to 1 Litre per kW of Heating Capacity. Unity enclosures are supplied with Condensate Drain Trays to allow the water that is produced during each defrost cycle to be routed out of the enclosure to a suitable drainage point

ENCLOSURE MANUFACTURE

Unity Acoustic Enclosure panels and parts are fabricated in Zintec Cold Rolled sheet steel to DIN ISO 9001 manufacturing standards. All exterior panels have a Polyester Powder Coat finish. All relevant internal faces have 25mm or 50mm waterproof and UV stable acoustic foam applied. Engineered fixings are used to facilitate simple panel removal and replacement

Unity enclosures can be supplied factory built or in 'flat pack' form for on site assembly – comprehensive instructions are provided showing the build process

ENCLOSURE POSITIONING, ACCESS AND VENTILATION

The Unity Acoustic Enclosure should either be installed on a flat and level surface capable of supporting the full operational weight, which includes the enclosed plant items or wall mounted using Environ Group Ltd integrated wall mount system or suitable alternative framework – if applicable a structural engineer should be consulted

Environ Group Unity enclosures are designed to allow 'stacking' and can be supplied with optional mounting feet to facilitate access under the enclosures – the mounting feet system is fully adjustable from 25mm up to 750mm and is designed to work on uneven surfaces

For satisfactory operation it is important that access and ventilation requirements are met. There must be sufficient space to fully remove the access doors, which also ensures correct inlet and discharge ventilation.

All services entry points, mechanical, electrical and drainage, shall be sealed correctly to ensure that the acoustic integrity of the enclosure is maintained.

ACOUSTIC PERFORMANCE – Standard Configuration

INSERTION LOSS DATA – Environ Group Unity Standard Configuration							
Octave Frequency in Hertz (db ref 2×10^{-5} Pascal's)							
63	125	250	500	1K	2K	4K	8K
12	13	20	29	36	37	39	41
Transmission Loss equates to an overall reduction of up to 26 dB(A)							

Options are also available to incorporate high performance acoustic foam to improve the acoustic performance if the situation demands

ACOUSTIC PERFORMANCE – High Performance Configuration (Cost Option)

INSERTION LOSS DATA – Environ Group Unity Standard Configuration							
Octave Frequency in Hertz (db ref 2×10^{-5} Pascal's)							
63	125	250	500	1K	2K	4K	8K
15	15	24	34	39	38	41	41
Transmission Loss equates to an overall reduction of up to 32 dB(A)							

IMPORTANT SAFETY INFORMATION

The acoustic enclosure system covered by this manual has been designed to be selected, installed, serviced, and maintained by competent persons only.

This manual does not cover normal safety precautions to be taken during the installation, pressure testing, evacuation or commissioning procedures associated with the enclosed Air Conditioning or Refrigeration plant. It is assumed that persons responsible for working on a refrigeration system are qualified and fully conversant with all necessary safety precautions and best industry practice.

MECHANICAL PLANT INSTALLATION PROCEDURES

Refrigeration pipe work and Electrical cabling should enter the enclosure in the correct areas provided – cut out sections can be included in the enclosure outer walls if requested. Where services enter the enclosure, it is the responsibility of the installing contractor to provide/fit Gland/Grommet fittings in line with best practice installation.

It is the responsibility of the installing contractor to provide for any Condensate produced by the mechanical plant. This must be routed from the integrated drain tray to outside of the enclosure via flexible or rigid drain pipe work.

MECHANICAL PLANT SERVICING PROCEDURES

IMPORTANT – Lift Off or Hinged panels allow access for service and maintenance – if appropriate suitable access platforms are to be used to comply with Working at Height legislation

Upon completion of servicing of plant items by designated contractor, it is important that the operative ensures that all relevant panels, plenum seals and access doors are fitted correctly

It is recommended that during the prescribed maintenance of the mechanical plant, that all internal airways of the enclosure are cleared of any dust and debris to ensure optimum performance

The exterior powder coated finish can be washed with non-abrasive/corrosive cleaning materials

EQUIPMENT REFERENCE SECTION

See attached selection sheet for further details of enclosures on the site referenced above