

23141: Premium House, Worthing

Report on Mechanical Ventilation and Associated Noise Mitigation Measures.

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Issue Record / Document Control

Issue Revision	Description	By	Date
P01	Initial Issue	BH	13/02/2024

1 Introduction

This document identifies the proposals for mechanical ventilation installations to serve new flats to be created within the existing building at Premium House, Worthing.

This is in response to the pre commencement planning condition 02 requiring submission of details of the sound reduction and ventilation measures based upon the strategies detailed in the Environmental Noise Survey and Assessment J3652 Issue 3.

2 Ventilation Proposals

2.1 MVHR Systems

2.1.1 Description

Each flat shall be provided with a dedicated mechanical ventilation heat recovery system. This shall comprise a dedicated MVHR unit incorporating heat recovery and summer bypass to prevent overheating in accordance with the requirements of Building Regulations Approved Document F1. Volume 1: Dwellings Means of Ventilation.

The selected MVHR units shall be attenuated and provided with vibration isolation mounting to meet the requirements identified in the Environmental Noise Survey.

Ventilation fresh air and exhaust shall be ducted to roof level, where the ducts shall terminate to atmosphere through dedicated attenuation units with requisite noise reduction to control the ingress of external noise.

Within the flats the air shall be routed from the MVHR through a proprietary attenuation pod, and then through ducting extending to supply and extract grilles located in each of the spaces served.

The general arrangement of the ventilation and attenuation measures is indicated upon drawing 23141-CDC-00-XX-DR-M-1000-S4-P01. Please refer to Appendix 1.0 of this report.

The four floors of flats are each identical so we have indicated one floor of typical flats for the purposes of this report.

2.1.2 Performance Requirements

Ventilation

Based upon continuous supply and extract ventilation with boost, in accordance with AD F1 of the building regulations, the ventilation requirements are tabulated as follows:-

Flat Type	**Floor Area (m^2)**	**ADF1 Table 1.2 (L/s)**	**ADF1 Table 1.2 (L/s)**	**ADF1 Table 1.3 (L/s)**	**ADF1 Table 1.3 (L/s)**	**Design High Rate (L/s)**	**Design Continuous Rate (L/s)**
		High Rate	High Rate	Continuous Rate on Number of Beds	Continuous Rate based on area @ 0.3L/s/m^2	**Kitchen + bathroom**	**Highest Continuous rate**
		Kitchen	Bathroom				
A	37	13	8	19	11.1	**21**	**19**
B	50	13	8	19	15	**21**	**19**
C	50	13	8	19	15	**21**	**19**
D	42	13	8	19	12.6	**21**	**19**

Table 1 Ventilation Flow Rates As ADF1

Internal Temperatures

Whilst it is not referred to in the planning condition, we have also allowed a system capacity that will achieve double the rates noted above, to limit summertime temperatures. This equates to approximately 1.5 air changes in the flats, which would the normal rate achieved by partly open windows and satisfactorily meet the requirements for existing buildings.

Noise

Referring to the Environmental Noise Survey and Assessment we note the following requirements.

6.3.1 SRI Requirement Summary

- East Façade (Lounges and Bedrooms) SRI Required: **40dB**
- North Façade (Lounges and Bedrooms) SRI Required: **35dB**
- West Façade (Lounges and Bedrooms) SRI Required: **35dB**

6.6 Ventilation

The sound pressure level from the systems (within the rooms that they serve) should be designed to meet the CIBSE Guidance Mechanical Ventilation Noise detailed below:

- Bedrooms: Mechanical services noise to be ≤ NR25dB
- Lounges: Mechanical services noise to be ≤ NR30dB

Any ducting associated with an MVHR installation should be mounted on anti-vibration mounts.

2.1.3 Equipment Selection

2.1.3.1 MVHR Unit

As noted we have selected equipment on double the minimum ventilation rate, I.e 42L/s on boost.

The same unit would be applied to all flats. We have selected a system pressure drop of 100Pa which allows for the losses through ducting and grilles etc for the worst case First floor flats. Flats at higher levels – nearer to the roof air terminations would experience lower duct length and hence lower pressure drops. The fan speeds would be lowered – producing lower noise levels to suit these flats.

The selected equipment is a Nuaire MRXBOXAB-ECO4 with direct coupled proprietary attenuator pod and discharge plenum.

Please refer to Appendix 1.0 for the manufacturers data sheet for the selected equipment.

We note the key features:-

- In duct noise spectrum after attenuation. This results in an NR level of approximately 22dB. This is acceptable as below the requirement of NR 25db, being the most onerous requirement for the bedrooms.

Please refer to Appendix 1.0 where we show in duct after attenuation noise levels plotted over the NR Curve. Document ref 23141-CDC-00-XX-CA-M-1001-S4-P01

- Breakout Noise. This is 27dBA, which equates to approximately NR 22db. Refer manufacturers data sheet, Appendix 1.0 Again, this is acceptable being below NR 25.
- MVHR unit and associated ductwork to be supported upon antivibration hangars / mounts.
- Ductwork and air terminals selected to ensure air flow and discharge noise limited to comply with CIBSE guides for the spaces served. I.e NR25 bedrooms and NR30 Lounge which also complies with noise survey requirements.

2.1.3.2 Fresh air and Exhaust Attenuation

Attenuators installed on the fresh air intakes and exhausts, located at roof level.

These have been specified to provide minimum 40db noise reduction as required under clause 6.3.1 of the Environmental Noise Survey.

There will in fact be further attenuation by virtue of the air path through the length of ducting from the roof to each flat. We have ignored this benefit.

3 Conclusion

3.1.1 Breakout Noise and in duct noise within Flats

The selected equipment achieves both break out and in duct levels of NR22 which is below the most onerous requirement of NR25 for bedrooms and is therefore acceptable.

3.1.2 Attenuation of External Noise

The specified intake and exhaust attenuation achieves a noise reduction of 40db which is compliant with the most onerous SRI requirement of 40db and is therefore acceptable.

4 Appendix 1.0

File Name	Title	Status
23141-CDC-00-XX-DR-M-1001	Typical Floor Mechanical Ventilation and Associated Noise Mitigation Measures.	S4-P01
23141-CDC-00-XX-CA-M-1001	In Duct NR Calculation MVHR	S4-P01
FanDataSheets-MRXMOX-ECO4	Manufacturers Fan Data Sheet	

Table 2 Schedule of Appendices