

Miller Goodall Ltd
Ashworth House
Deakins Business Park
Blackburn Road
Egerton
Bolton
BL7 9RP

22nd December 2023

Nick Harden
Edifice Building Consultants Limited
Office 2, The Old Printworks,
Bowden Lane,
Stockport SK6 6ND

Dear Nick,

RE: CDN/23/0369 Jefferson Place: MEV Noise Assessment

In response to the local planning department's feedback, this letter addresses the following requirements:

- *Assessment of the mechanical ventilation hasn't been included. The internal noise criteria will need to be met with the Mechanical ventilation in full operation (including during any boost function) so assessment will be required to confirm that mechanical ventilation won't lead to an exceedance of the day and night time noise criteria and details of any acoustic insulation requirements should be recommended where required.*
- *Assessment of any façade penetrations will be required such as the air intake and details of any acoustic attenuation to these penetrations will be required to ensure it does not provide a noise break in source which will lead to an exceedance of the internal noise criteria.*
- *We will require a scheme of validation once the apartment has been completed and prior to occupation to include day and night time internal noise measurements to demonstrate that the internal noise criteria has not been exceeded. Noise measurements will need to be undertaken whilst the*

Table 1: Manufacturer's Sound Power data for MEV unit ('trickle' – 19 l/s)

Sound Data

Noise calculated speed controlled to required duty (48.49%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Open Inlet	46	48	51	47	48	41	32	24	
Open Outlet	41	55	60	60	56	53	43	25	
Breakout	44	45	47	43	36	34	25	19	23

dBA is spherical at 3 metres. For hemi-spherical add 3 dBA.

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.

Table 2: Manufacturer's Sound Power data for MEV unit ('boost' – 21 l/s)

Sound Data

Noise calculated speed controlled to required duty (53.3%)

Sound Power Levels re 1 pWatts (Hz):

Hz	63	125	250	500	1k	2k	4k	8k	dBA
Open Inlet	46	51	55	52	52	45	36	28	
Open Outlet	43	57	62	63	58	55	45	31	
Breakout	44	47	50	47	39	38	27	21	26

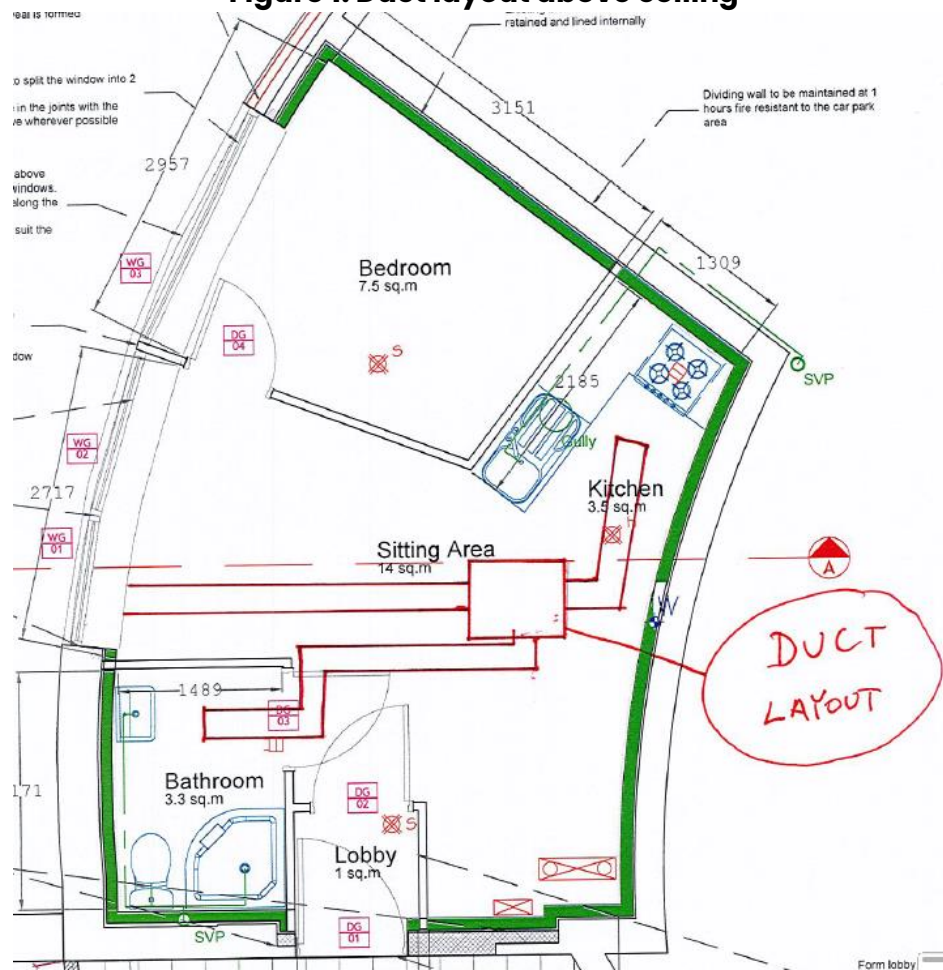
dBA is spherical at 3 metres. For hemi-spherical add 3 dBA.

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.

The relevant data is highlighted in red above. The 'outlet' side terminates at the building façade so does not factor into the prediction for internal noise levels in the apartment. It is the inlet side which terminates within the apartment. The breakout level of up to 26 dBA at 3 m would be comfortably below the internal noise limits due to the reduction that would occur both within the insulated ceiling voids and then through the ceiling, which comprises two layers of 15 mm high density plasterboard (SoundBloc).

The ceiling duct layout above the ceilings for the MEV unit is shown below.

Figure 1: Duct layout above ceiling



We have been unable to obtain the duct dimensions at this stage and have therefore assumed a realistic dimension of 204 mm x 60 mm (which is an available dimension for the proposed duct product; a Manrose 55020 Flat Channel rigid PVC duct). Similarly we have been unable to obtain information about the duct termination dimension in the ceilings, and have therefore assumed a circular ceiling inlet with a realistic dimension of 180 mm in diameter.

Attenuation of MEV fan noise through the duct, and the resulting predicted in-room noise level, was calculated using the methods described in CIBSE Guide B4 (Noise and vibration control for building services systems) for a receptor standing 1 m away from the ceiling termination.

As can be seen, there is no extract ducting routed to the bedroom, and therefore the calculation of internal noise levels resulting from the MEV have been carried out for the main living space only. The recommended daytime criterion for internal noise levels in Living Rooms is 35 dB L_{Aeq} .

The recommended limit of 35 dBA applies to spaces under normal (background) ventilation rates. It is normally considered permissible to allow for increased noise levels when higher ventilation rates are being provided. In this case we would suggest that the limits are relaxed by up to 5 dB when the MEV is operating in 'boost mode', and the recommended limit under this scenario would therefore be 40 dBA.

The predicted noise levels in the living room when the MEV is operating are shown below:

- Internal noise level from MEV ('trickle' mode): 42 dBA
- Internal noise level from MEV ('boost' mode): 46 dBA

As can be seen from the results above, the predicted noise levels are above the recommended limits. Mitigation in the form of an induct silencer on the room side (kitchen) extract duct is therefore recommended. The minimum insertion loss of the silencer should achieve the following specification:

Table 3: Insertion Loss requirement for in-duct silencer

In-duct Silencer	Octave band centre frequency (Hz), dB							
	63	125	250	500	1 kHz	2 kHz	4 kHz	8 kHz
Minimum insertion loss (dB)	0	0	10	16	22	8	8	0

With the inclusion of an in-duct silencer meeting the minimum specification above, the predicted internal noise levels in the living room would be as follows:

- Internal noise level from MEV ('trickle' mode with silencer): 28 dBA
- Internal noise level from MEV ('boost' mode with silencer): 32 dBA

As can be seen, the predicted internal noise level with the inclusion of the recommended silencer would be comfortably within the recommended criteria.

The predicted cumulative noise level from the operation of the MEV unit with environmental break-in via the façade is predicted to be as follows:

- MEV ('trickle' mode with silencer) + environmental break-in: 31 dBA
- MEV ('boost' mode with silencer) + environmental break-in: 34 dBA

Therefore the cumulative noise levels from the combined use of the MEV with the inclusion of environmental break-in noise achieves the recommended limits when the recommended in-duct silencer is implemented.

Environmental Noise Break-in via MEV façade termination

We have been unable to obtain information about the duct termination dimension at the building facade and have therefore carried out a 'worst-case' simplified assessment.

In order to demonstrate that environmental break-in via the façade MEV termination will not contribute significantly to the internal noise levels, we have carried out a basic façade break-in calculation which uses the as-measured external noise levels as the source data, and applies a simple reduction through the ceiling (assuming the full ceiling area is exposed to the externally measured level) for noise breaking through the duct and ceiling below.

The ceiling has been confirmed as 2 layers of 15 mm high density plasterboard (SoundBloc), which provides significant acoustic performance over a more typical single layer of 12.5 mm standard density plasterboard.

We have also considered the contribution along the duct and breaking out into the kitchen/living rooms space.

In order to reduce the noise via this path, it is recommended to install an additional silencer on the atmospheric (façade side) of the MEV, meeting the same minimum specification specified in Table 3. Ideally this should be located early in the duct, in line or just behind the façade line. This will both reduce noise transfer sufficiently into the apartment but would also mitigate any risk of operational noise travelling out at the façade and potentially disrupting any adjacent dwellings which may have their windows open.

The resulting internal noise level based on a worst-case simplified calculation is shown below:

- Environmental break-in through ducts and ceiling (worst-case): 30 dBA

As can be seen, the predicted internal level is 5 dB below the recommended limit for daytime noise levels in living rooms.

Cumulative Internal Noise Levels with Recommended Mitigation in Place

The total cumulative noise level due to all contributing factors described above has been predicted. These contributing factors are as follows:

- environmental noise break-in via façade (windows, trickle vents and external wall)
- environmental noise break-in via the MEV vent (via ceiling and ductwork)
- MEV noise via ductwork

The resulting predicted internal noise levels are as follows:

Bedroom:

30 dB $L_{Aeq,T}$ (average)
41 dB $L_{Aeq,T}$ (maximum)

(Note that these levels are unaffected by operation of the MEV).

Living Room ('Sitting Area' & 'Kitchen'):

Trickle: 34 dB $L_{Aeq,T}$ (average)
Boost: 35 dB $L_{Aeq,T}$ (average)

Summary of Recommended Mitigation

The mitigation recommended is summarised below:

- Glazing: 6/12/6 mm glazing
- Trickle ventilators: standard non-acoustic trickle ventilators (2 in living room; 1 in bedroom)
- In-duct silencers: 2no silencers achieving the minimum specification provided in Table 3 above; 1no at the façade end of the duct and 1no on the room side (after the MEV unit).

Conclusion

Updated internal noise level calculations reflect the most recent room dimensions and the impact of the proposed MEV unit, accounting for both duct-borne mechanical noise and environmental noise intrusion through the ducts.

With the suggested mitigation measures, the cumulative noise levels meet the recommended limits.

This letter has been provided to address the requirements of the first two bulleted items provided by the local authority as reproduced at the start of this letter.

Best Regards,



Michael Rickard MIOA
Associate Director – Miller Goodall

michael@millergoodall.co.uk