

Acoustics for regenerative design

HEALTHY
BUILDINGS

CONFERENCE & EXPO 2021

PRODUCTS • PEOPLE • PLANET

Wednesday 24th February 2021 | Online

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Jack Harvie-Clark



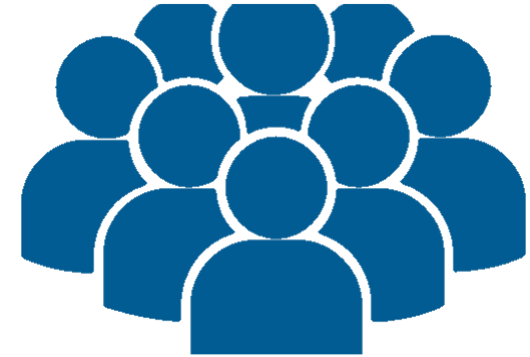
About Apex Acoustics



2006



One of the largest independent acoustic consultancies in the UK



21 consultants



Three offices, work nationwide



Multi-award winning

Regenerative design

GHA 2020 MANIFESTO

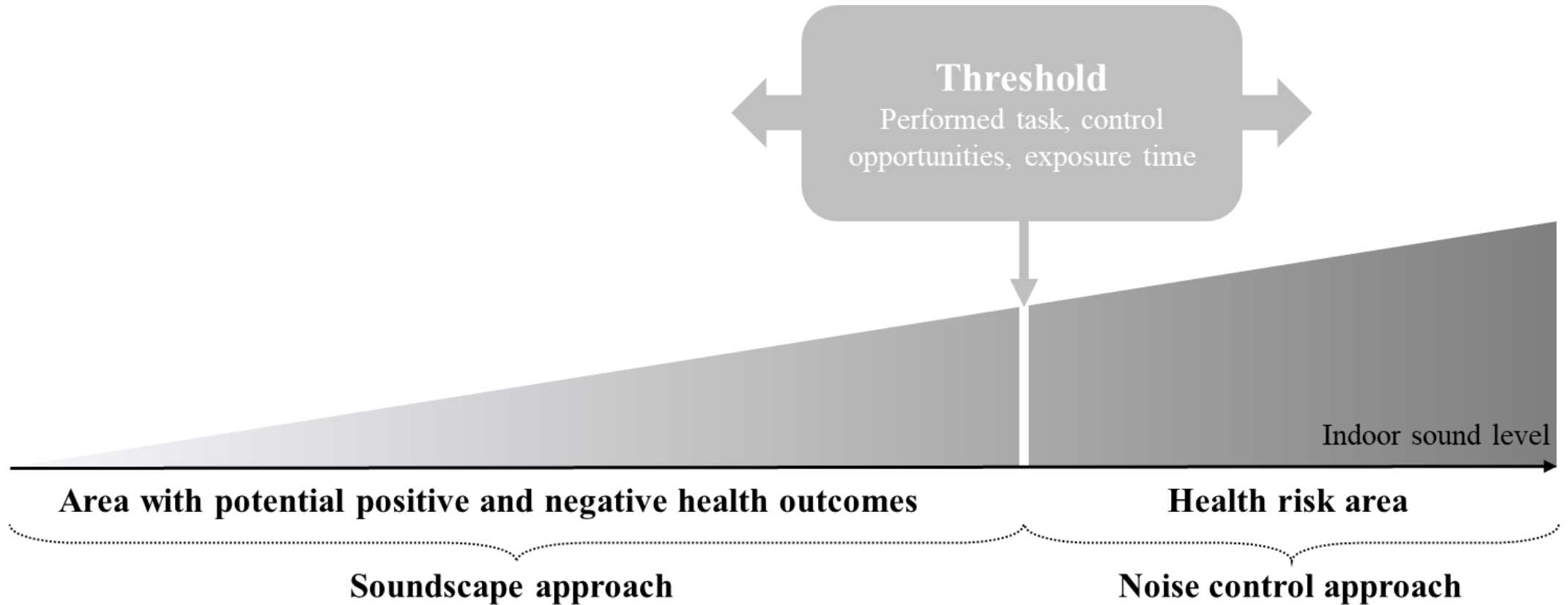
HOMES FIT FOR THE FUTURE A 'Regenerative' Vision

<https://goodhomes.org.uk/gha-2020-manifesto>

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 apexacoustics

Regenerative design for acoustics



[Acoustics for Supportive and Healthy Buildings: Emerging Themes on Indoor Soundscape Research](#)

Sustainability 2020, S Torresin, F Aletta, F Babich, E Bordeau, J Harvie-Clark, J Kang, L Lavia, A Radicchi, R Albatici

Why is sound so important to us?



We can hear with our eyes

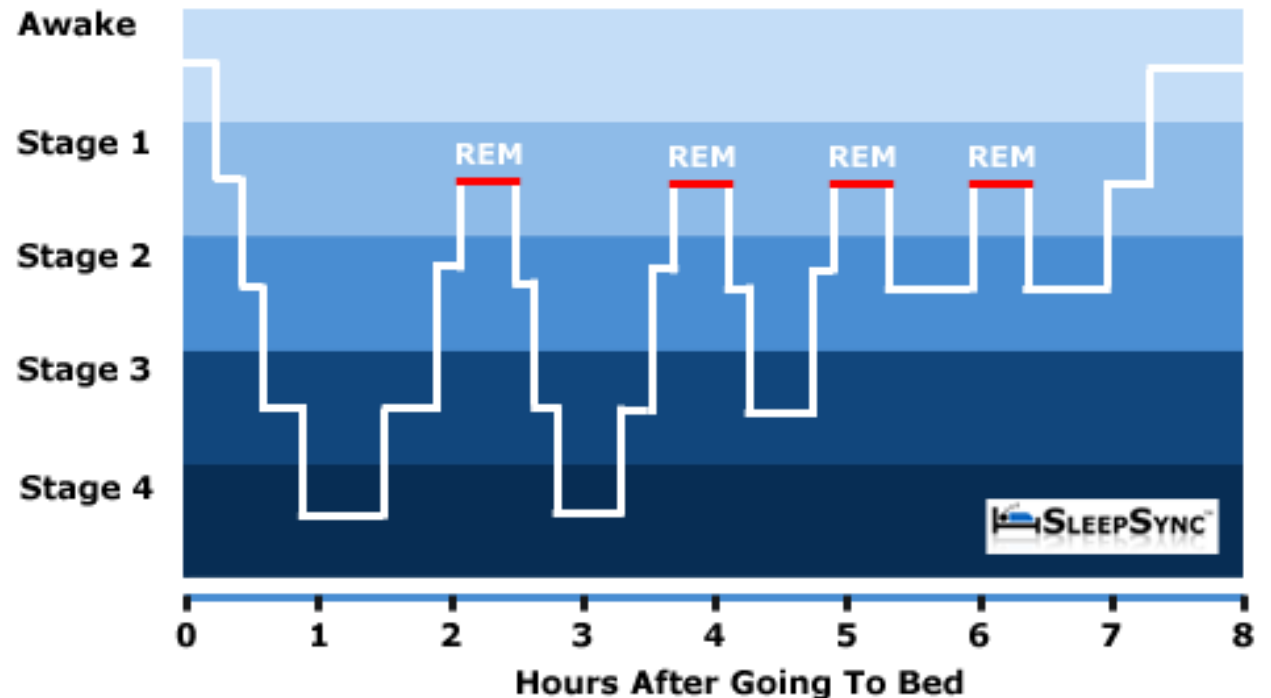




Excessive noise is detrimental to our health

- Annoyance
- Sleep disturbance
- Increased stress
- Increased heart rate
- Increased blood pressure
- Risk of heart problems

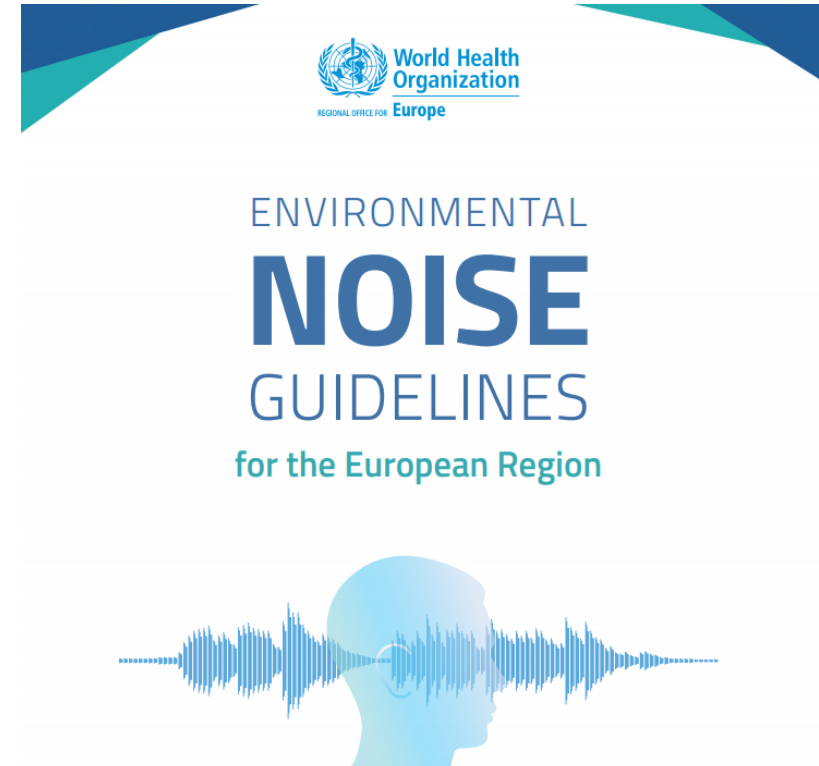
A Typical 8 Hour Sleep Cycle



How big is the problem?

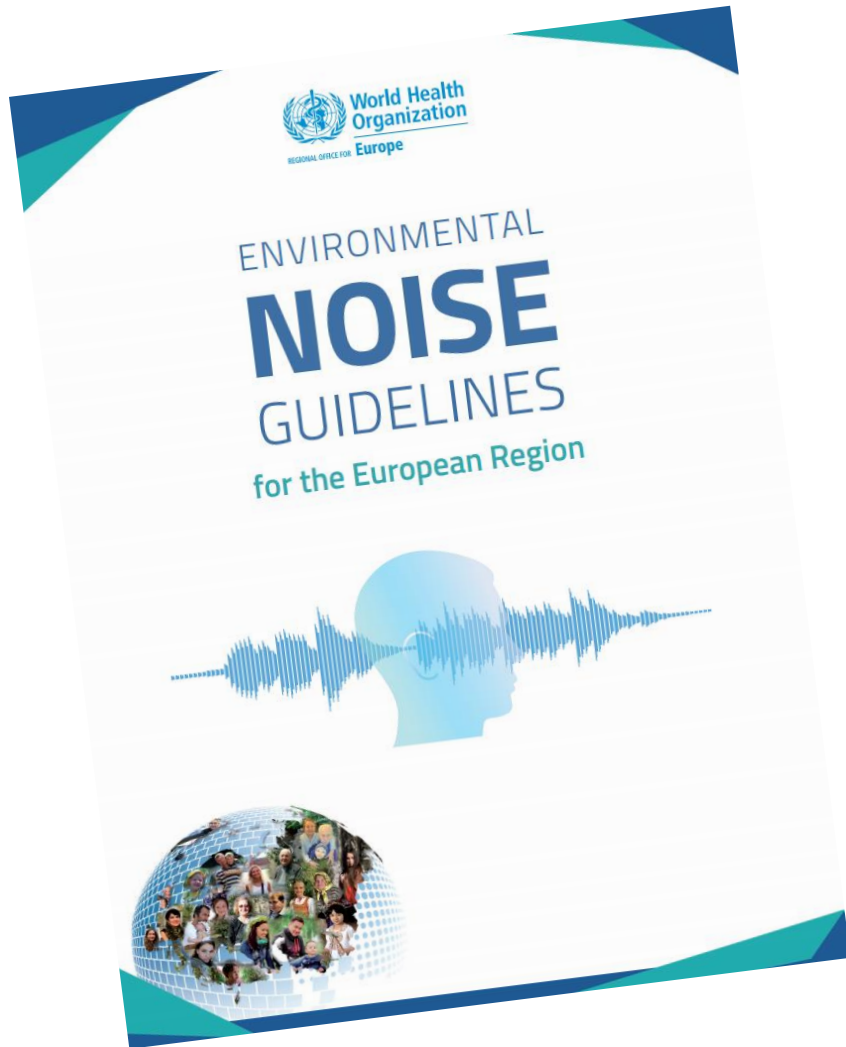



[Burden of disease from environmental noise, WHO, 2011](#)



[Environmental Noise Guidelines, WHO, 2018](#)

WHO Guidelines



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Road traffic noise

Recommendation

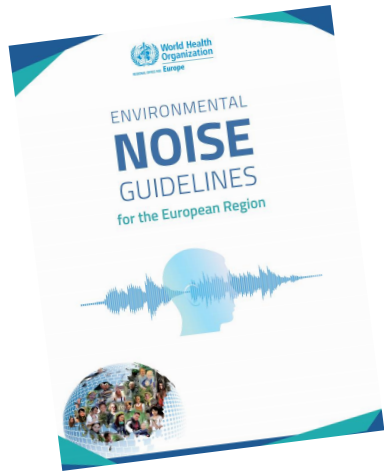
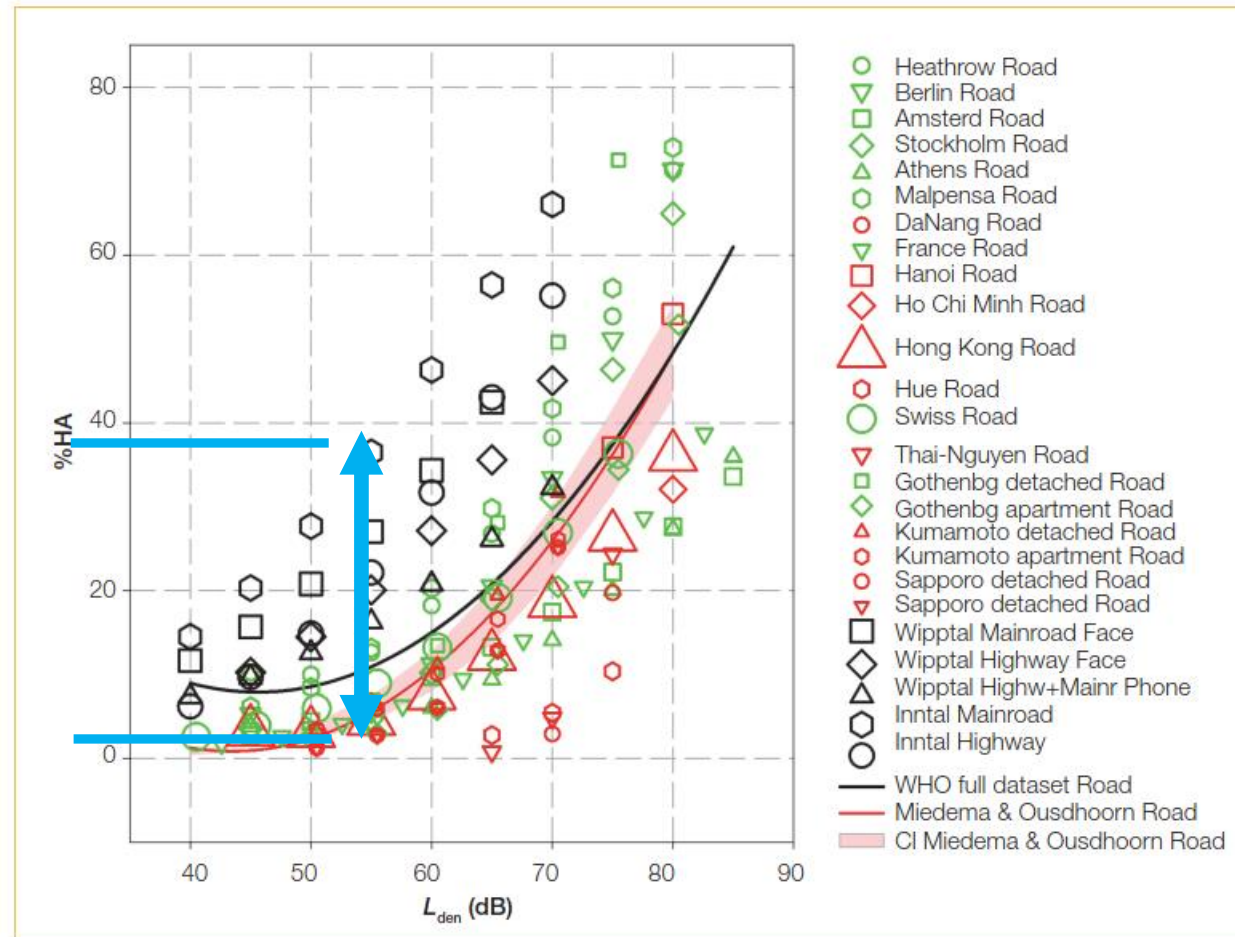
For average noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic below **53 decibels (dB) L_{den}** , as road traffic noise above this level is associated with adverse health effects.

For night noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic during night time below **45 dB L_{night}** , as night-time road traffic noise above this level is associated with adverse effects on sleep.

[Environmental Noise Guidelines for the European Region \(2018\)](#)

WHO Guidelines

Fig. 6. Scatterplot and quadratic regression of the relationship between road traffic noise (L_{den}) and annoyance (%HA)



Indoor Environmental Quality

- Air quality
- Thermal
- Acoustic
- Visual



The current situation in the industry

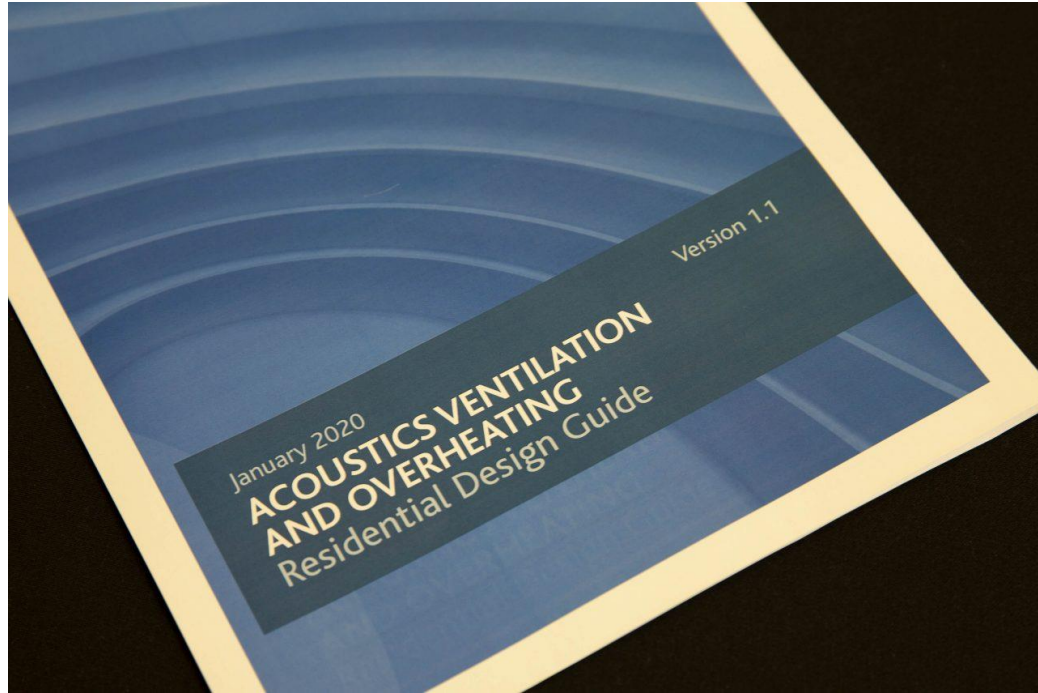
85% of planning applications assumed:

- Windows are **open** for the overheating assessment
- Windows are **closed** for the noise assessment



[Using Planning Conditions to Improve Indoor Environmental Quality \(IEQ\) of New Residential Developments](#)
N Conlan, J Harvie-Clark, Proc. IOA Vol. 40. Pt. 1. 2018.

Acoustics, Ventilation & Overheating: Residential Design Guide



| | Ventilation | Overheating |
|-------------------------|-------------|-------------|
| Environmental noise | ✓ | ✓ |
| Building services noise | ✓ | ✓ |

<https://www.association-of-noise-consultants.co.uk/avo-guide>

Consultation on new Part L for residential buildings: January 2021



Ministry of Housing,
Communities &
Local Government

Consultation version: not statutory guidance

Approved Document [X] – Overheating

Consultation version – January 2021

The Future Buildings Standard

Consultation on changes to Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations for non-domestic buildings and dwellings; and overheating in new residential buildings

<https://www.gov.uk/government/consultations/the-future-buildings-standard>

Consultation on new Part L for residential buildings: January 2021

Consultation version: not statutory guidance

Section 3: Ensuring the overheating strategy is usable

Consultation version: not statutory guidance

Approved Document [X] – Overheating

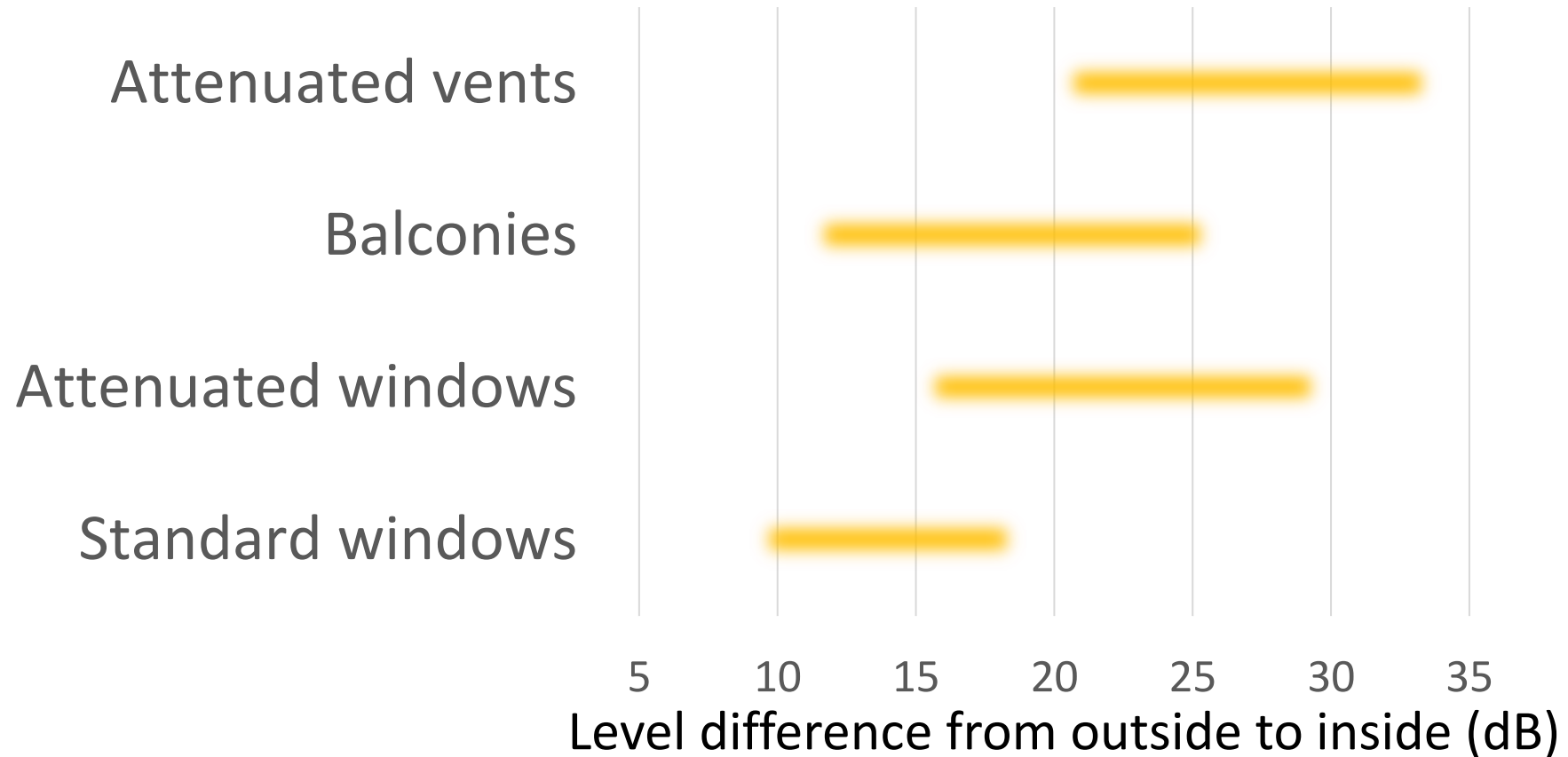
Consultation version – January 2021

Noise

- 3.1. When the removing excess heat part of the overheating strategy is in use, noise levels in bedrooms should be kept to a minimum during the sleeping hours of 23.00 – 07.00. Noise within bedrooms should not normally exceed the following limits.
- a. When openings are used
 - i. 40 dB $L_{Aeq, T}$, averaged over 8 hours.
 - ii. 55 dB L_{AFmax} , maximum no more than 10 times a night.
 - b. When a mechanical system is used
 - i. 30 dB $L_{Aeq, T}$, averaged over 8 hours.

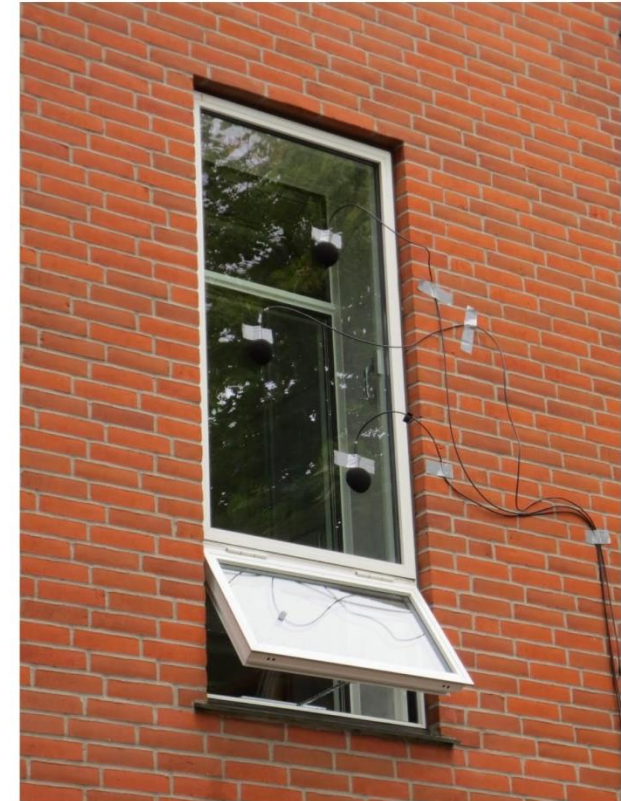
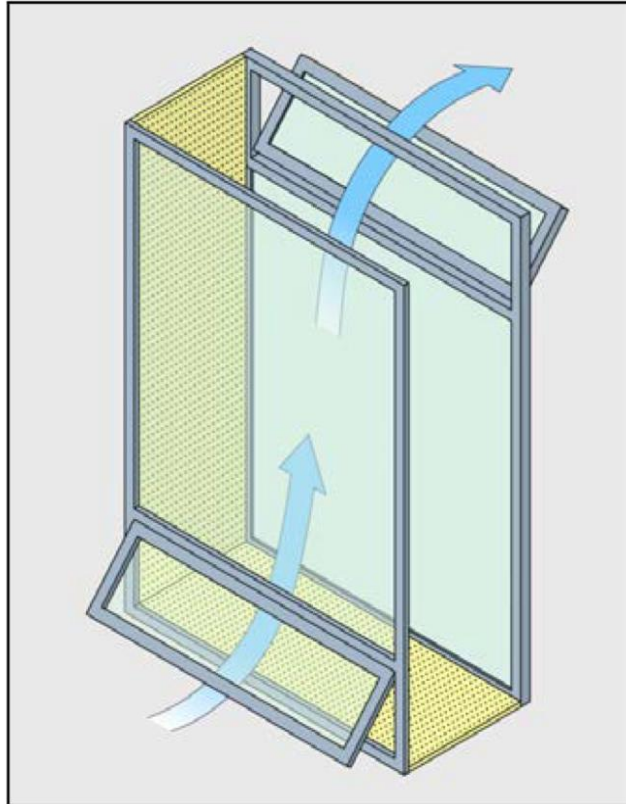
<https://www.gov.uk/government/consultations/the-future-buildings-standard>

Passive attenuated options

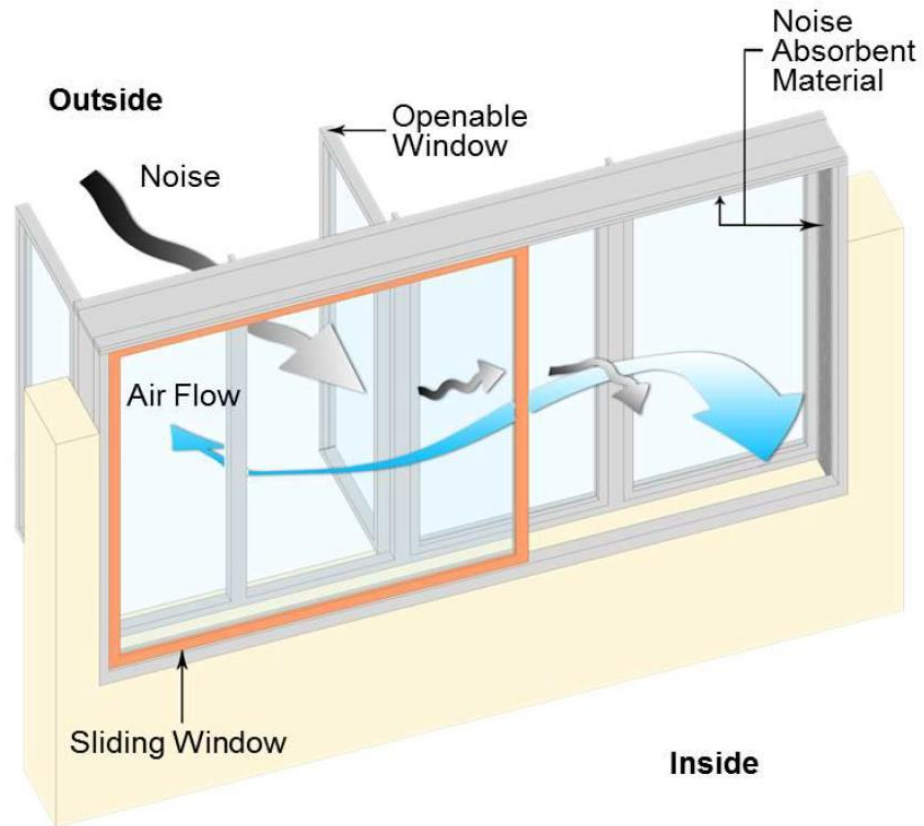


www.apexacoustics.co.uk/attenuated-passive-ventilation-options/

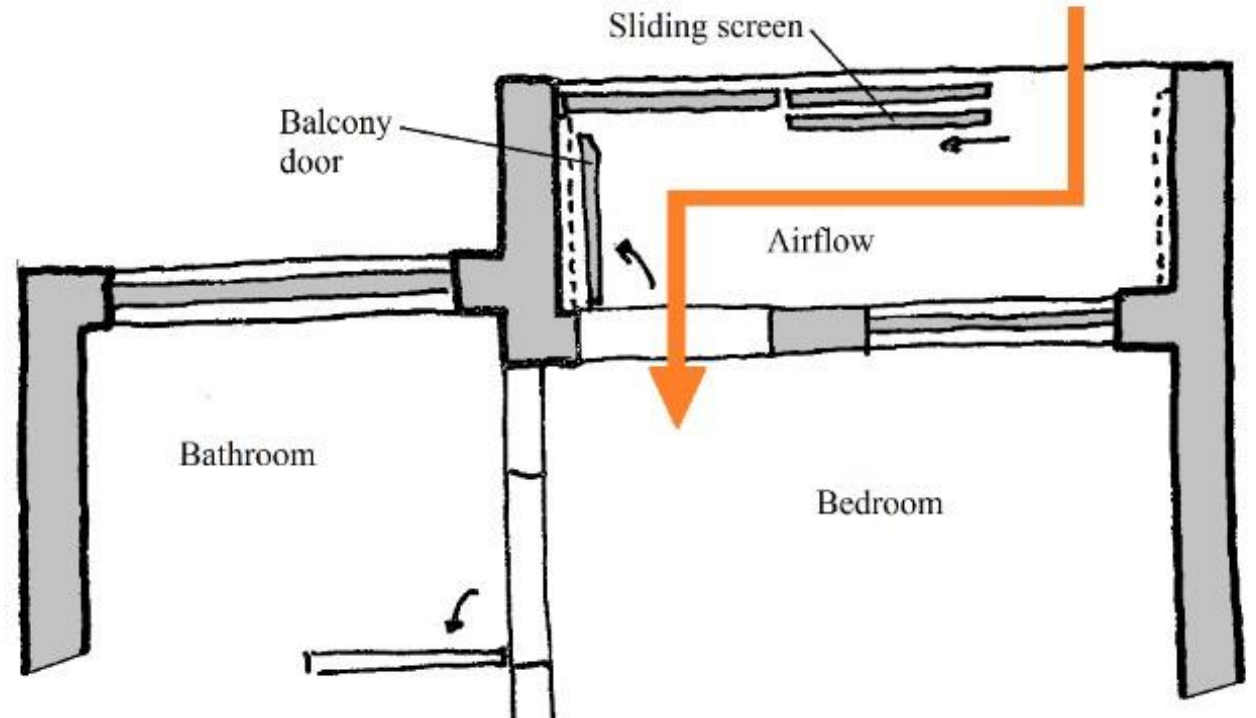
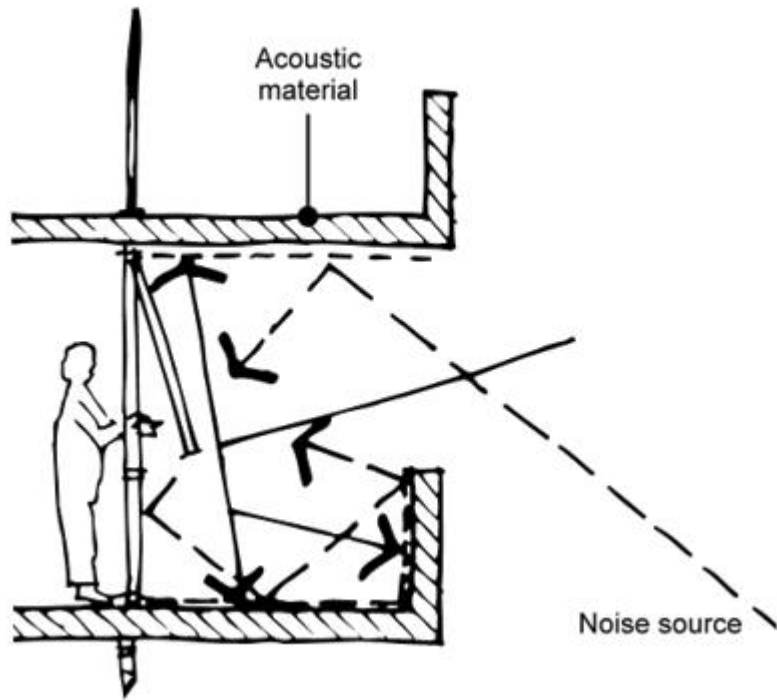
Example of attenuated windows



Example of attenuated windows



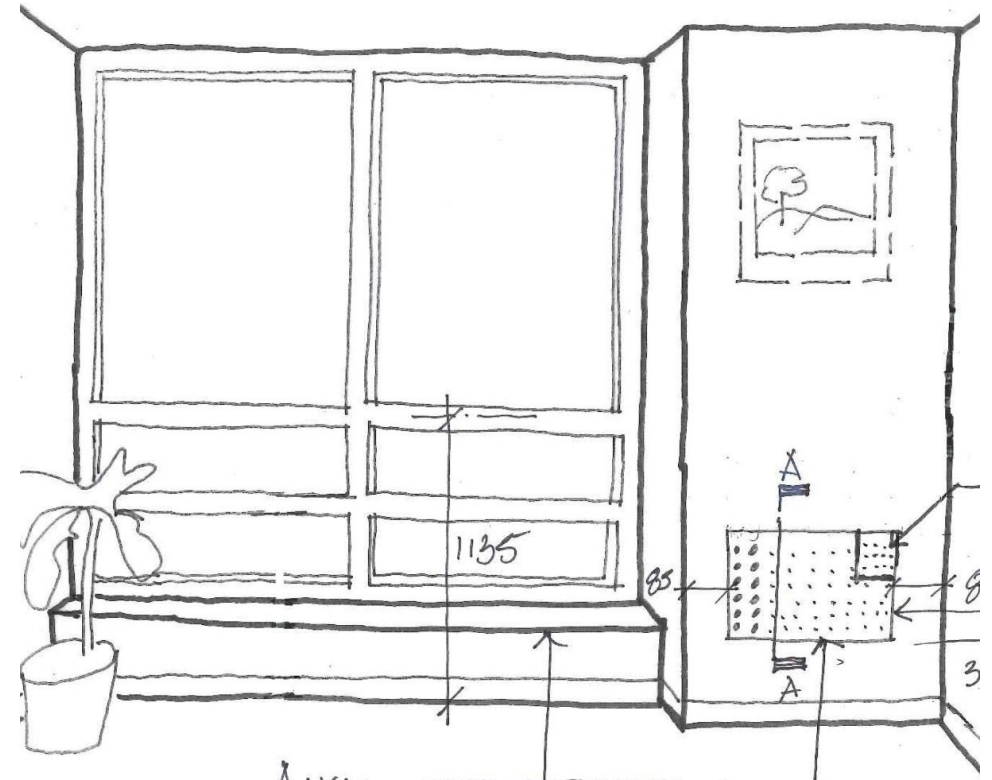
Examples of attenuating balconies



Example of attenuated vents



Example of attenuated vent with mechanical assistance



[Ventilative cooling in noisy environments: practical options for the UK](#)
N Conlan, J Harvie-Clark, Proc. IOA Vol 42 Pt. 1 2020


Ask more of your acoustician!

Jack Harvie-Clark

jhc@apexacoustics.co.uk



<https://www.apexacoustics.co.uk/acoustics-ventilation-overheating-guide-cpd-briefing/>

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