

ISO 3382-3 FOR SUSTAINABLE OPEN-PLAN OFFICES

ANC Annual Conference – 29th June 2016

Anthony Chilton

MAX FORDHAM

OVERVIEW

- Sustainable open-plan office
- Case Study
- 3382-3 Measurements
- Post occupancy evaluation
- Design approach

SUSTAINABLE OPEN-PLAN OFFICE



Bourne Hill Offices, Salisbury

Conventional

Mechanically ventilated

Mechanically cooled

Low ceilings, high screens

Sustainable

Naturally ventilated

Passively cooled (concrete soffits)

High ceilings, low screens

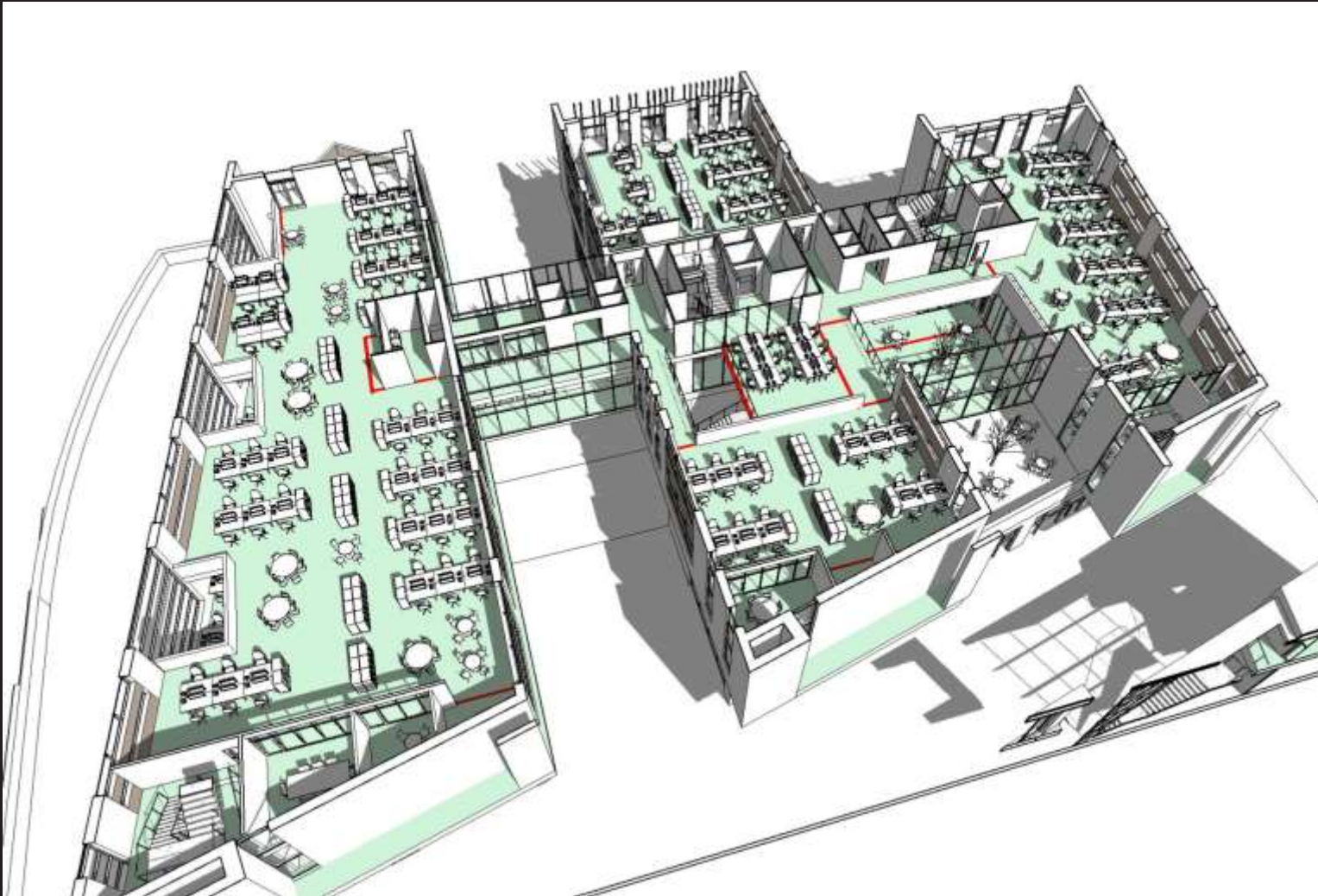
CASE STUDY - KEYNSHAM

MAX FORDHAM



CASE STUDY - KEYNSHAM

MAX FORDHAM

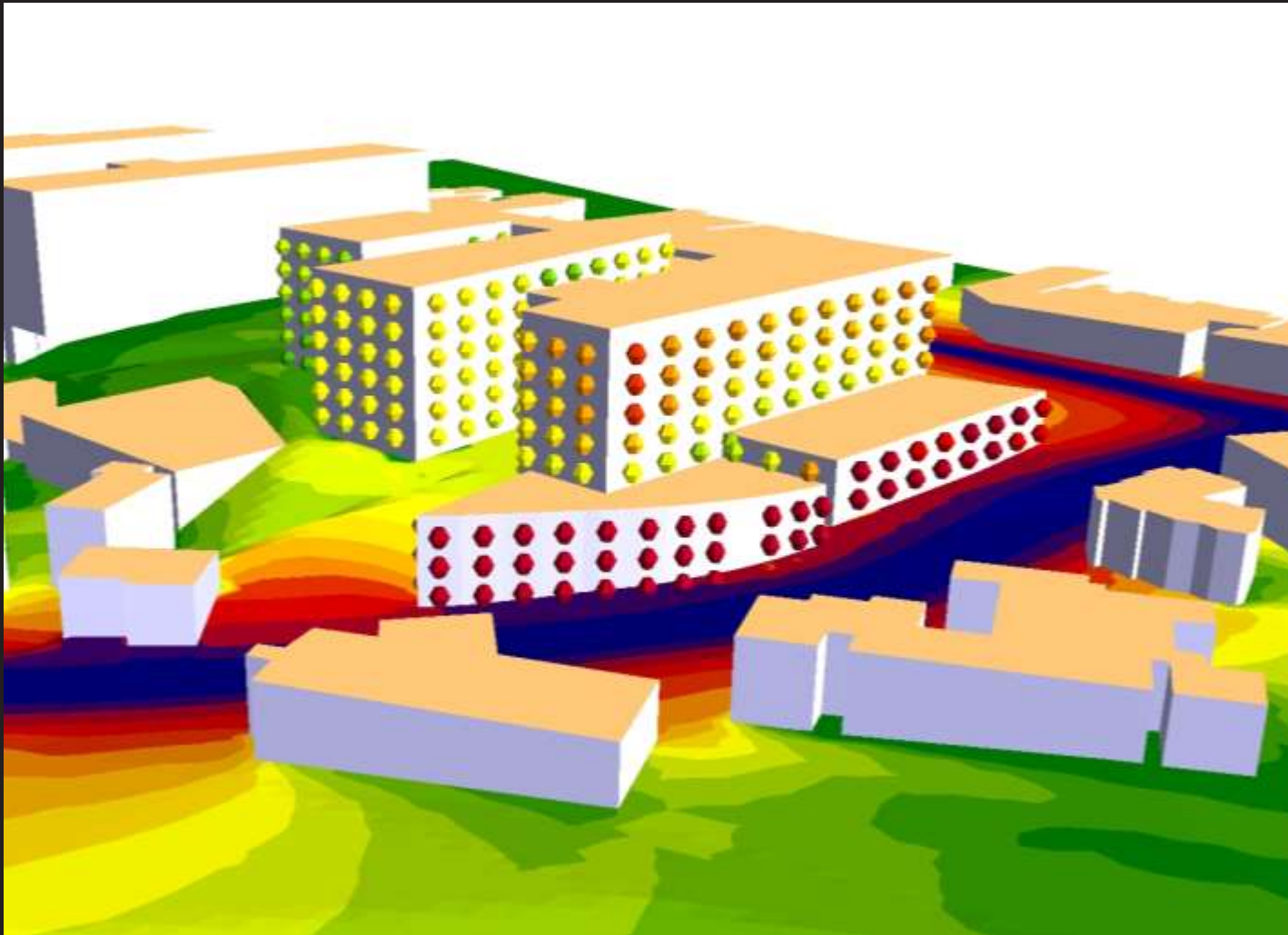


CASE STUDY - KEYNSHAM

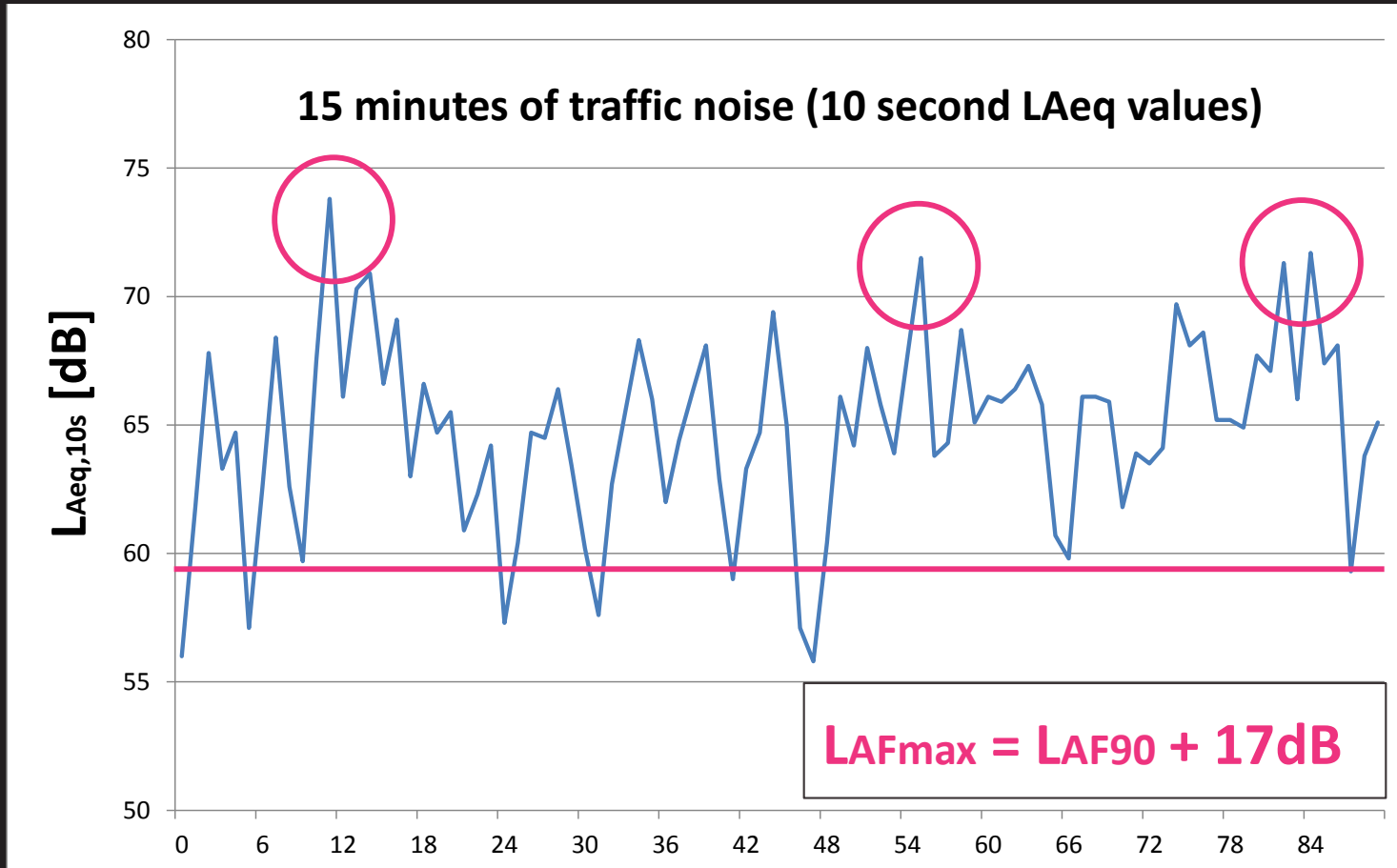


MAX FORDHAM

KEYNSHAM – EXTERNAL NOISE



KEYNSHAM – EXTERNAL NOISE



○ Hard to provide masking noise without disturbance.

KEYNSHAM – NATURAL VENTILATION

- Vent Area approx. 5% of floor area
(or 10% of façade area)

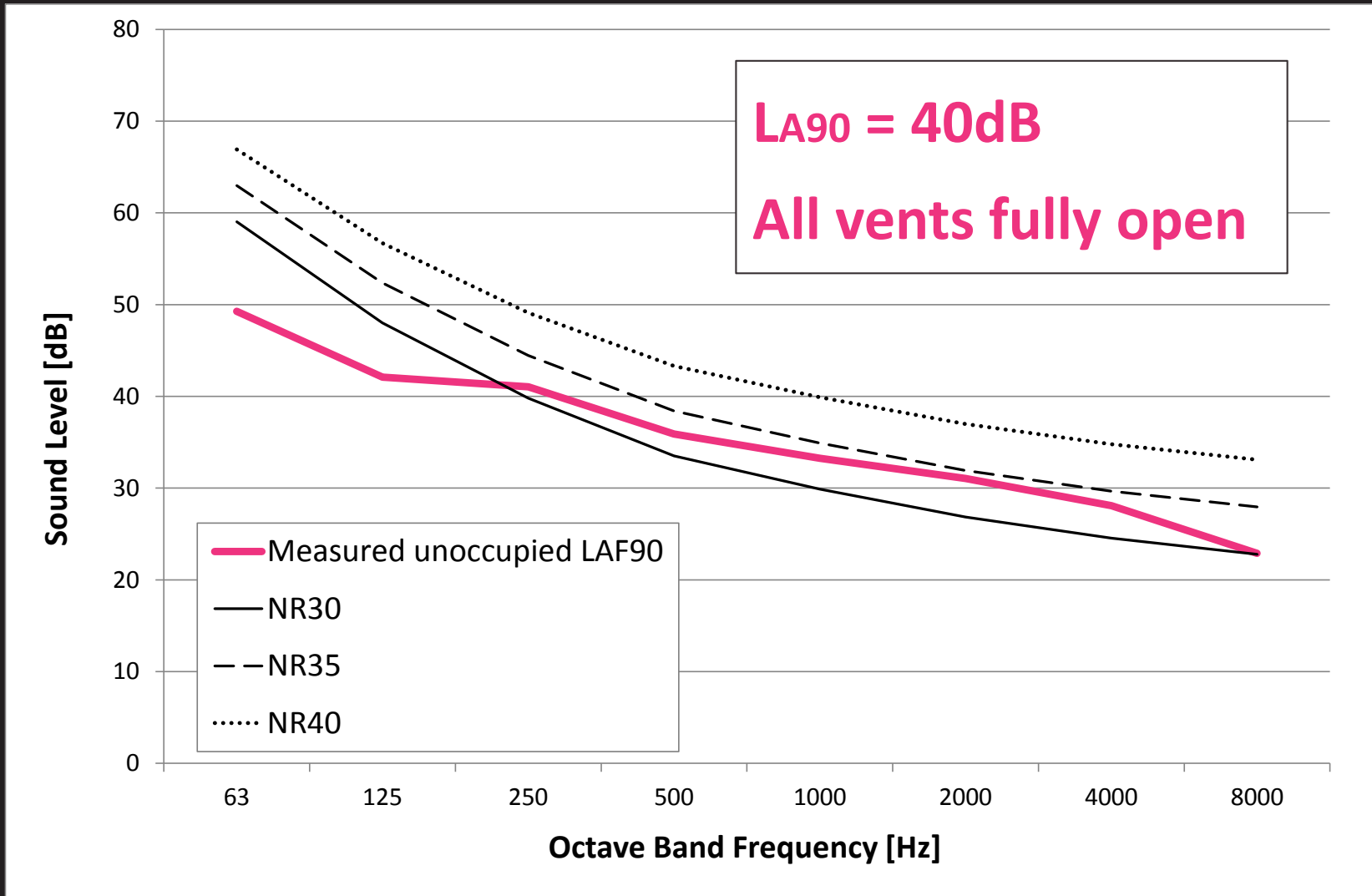


KEYNSHAM – ACOUSTIC LOUVRES



MAX FORDHAM

MEASURED INDOOR NOISE LEVEL

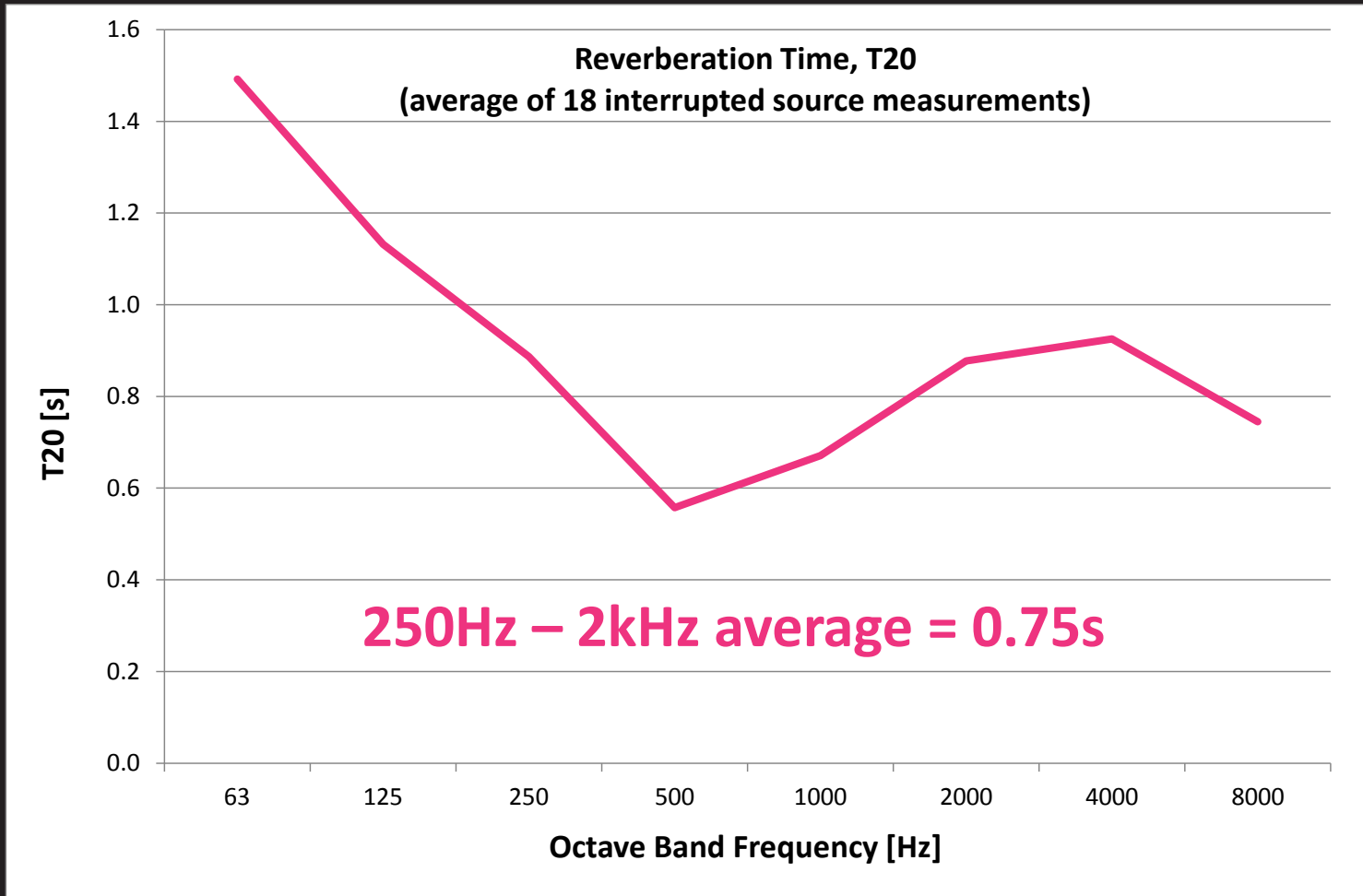


KEYNSHAM - ABSORPTION

- 50% of the ceiling area is exposed concrete to provide passive cooling.
- The other 50% is perforated $\alpha_w=0.7$ (Class C)
- Absorbent outer surfaces to balustrades. Slatted timber.
- Absorbent desk dividers.

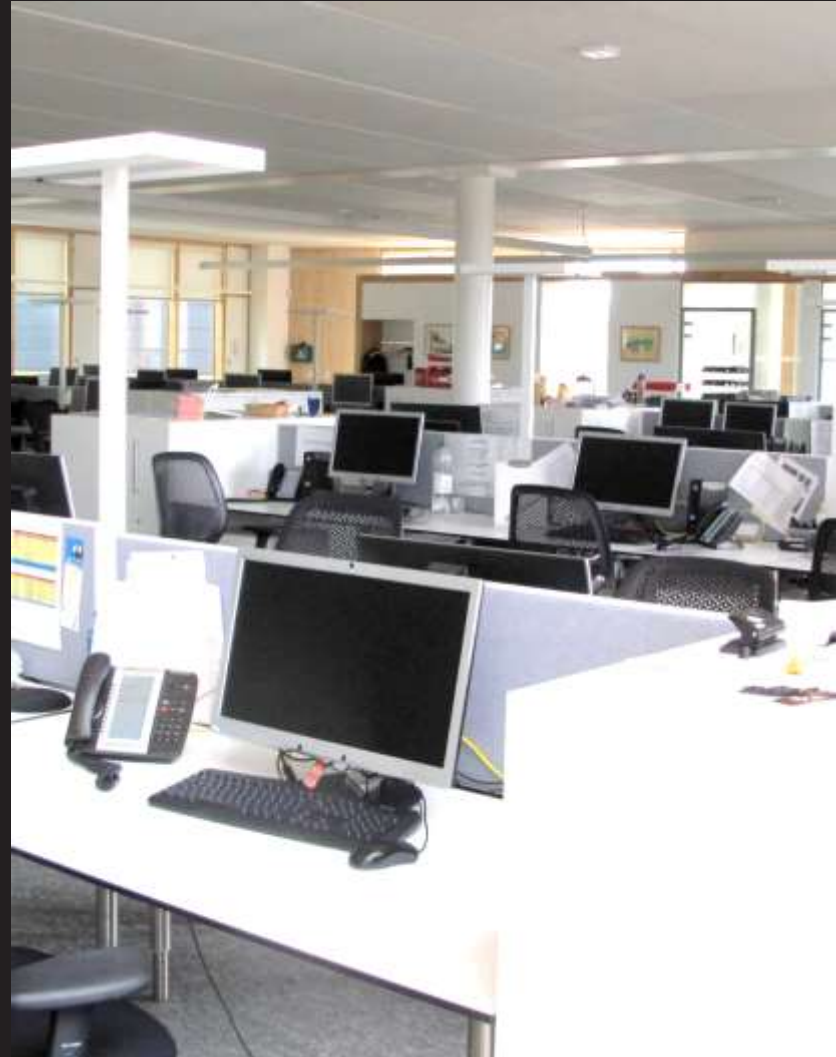


REVERBERATION CONTROL



KEYNSHAM - SCREENING

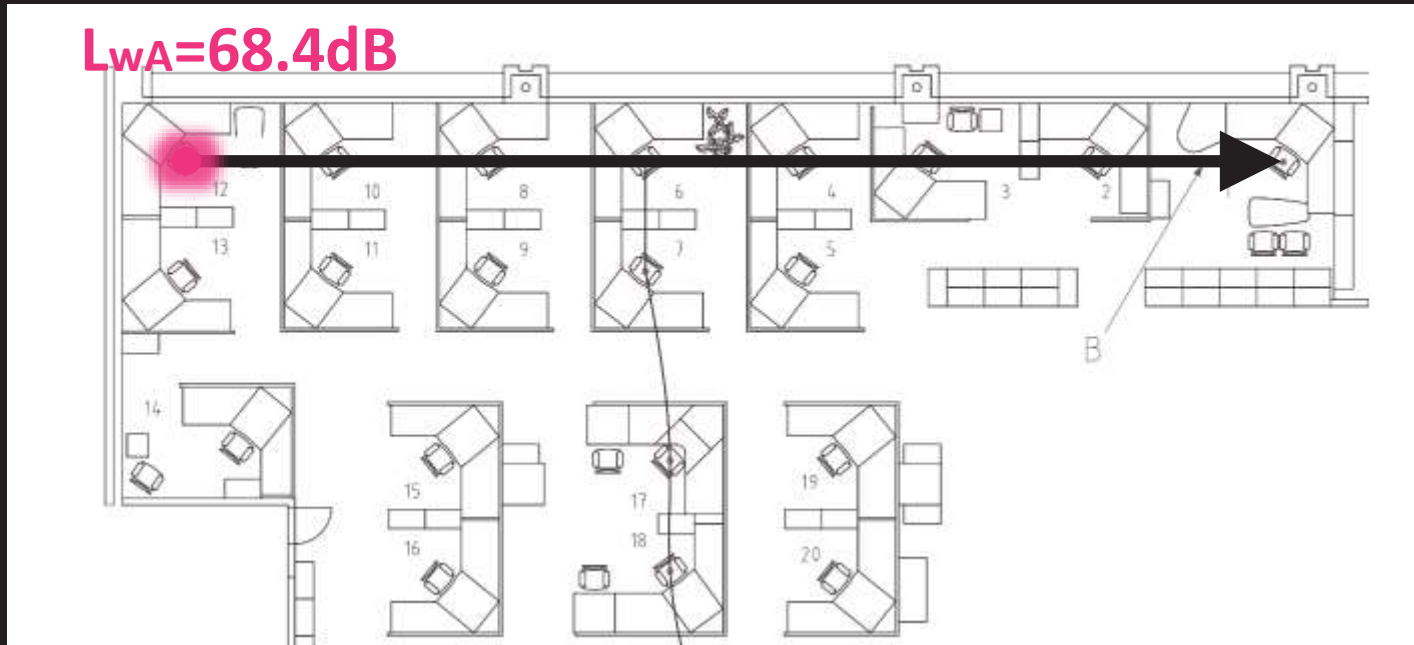
- Minimal screening – only desk dividers.
- 1100mm high (from floor).
- Do not block direct sound.



KEYNSHAM – SUMMARY

- Low masking noise.
- Low absorption.
- Low screening.
- What is the significance for privacy?

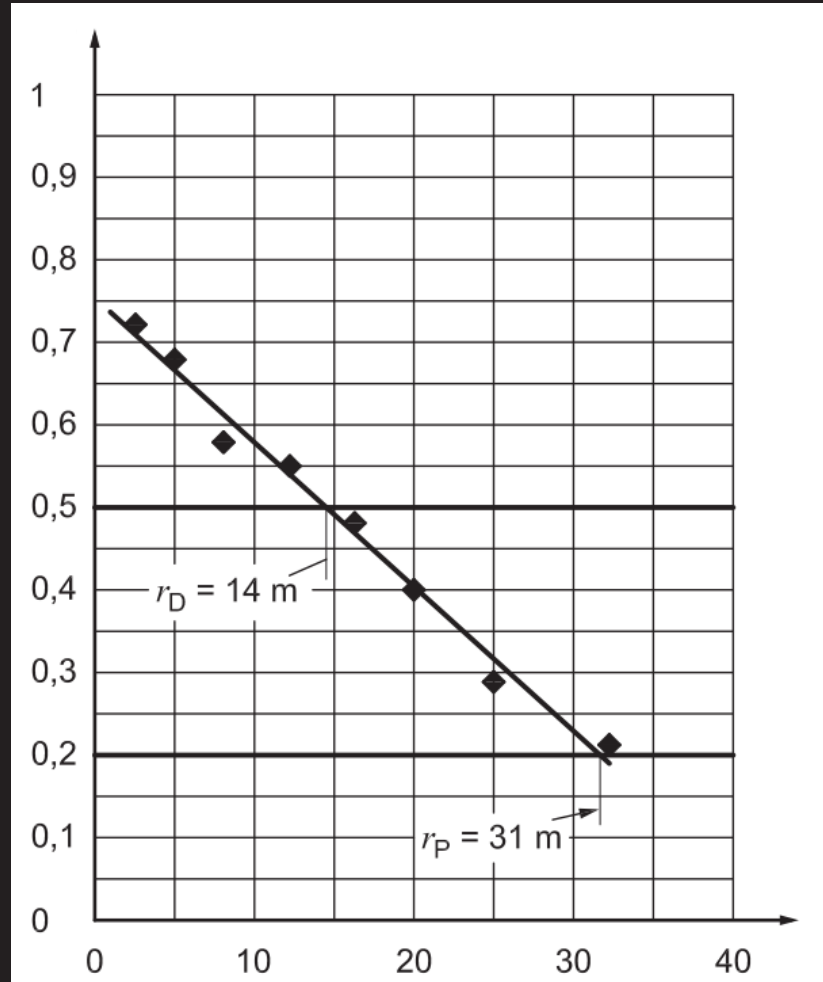
3382-3 MEASUREMENTS



○ r_D (Distraction Distance)

SPEECH INTELLIGIBILITY

STI

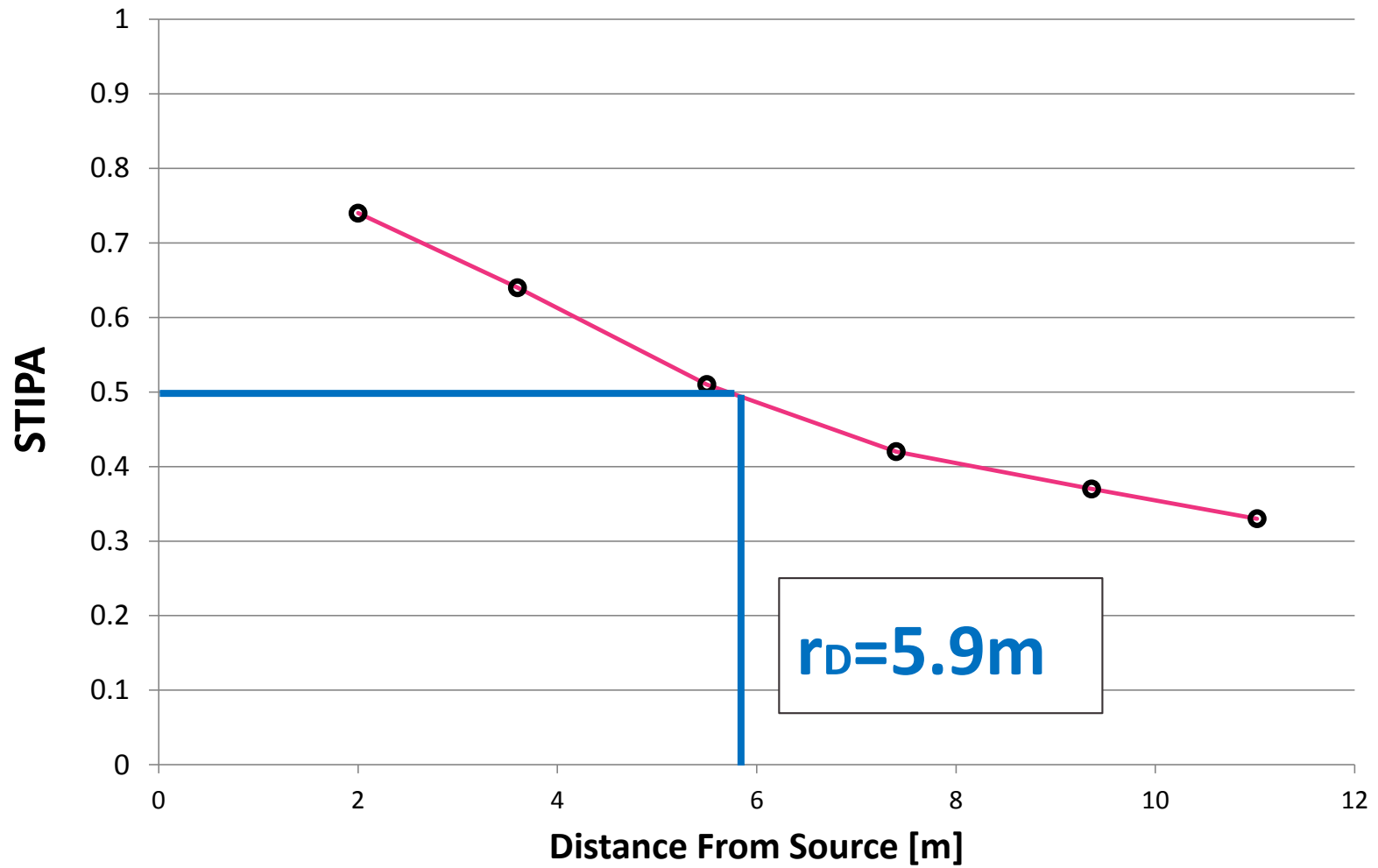


Distance [m]



MAX FORDHAM

DISTRACTION DISTANCE



CLASSIFICATION

Finnish Institute of Occupational Health
(Keränen, Hongisto, Virjonen)

Class	r_D
A	<5m
B	5 - 8m
C	8 - 11m
D	11 - 15m
E	> 15m

○ Is Class B suitable for Keynsham?

POST-OCCUPANCY EVALUATION

- Total Performance of Low Carbon Buildings
- 8 office buildings in the UK, 16 in China.
- 4 POE acoustic questions.
- Acoustic control parameters will be recorded.

CONTROL PARAMETERS

- Occupancy
- Activity Type (similar to NF 31-199)
- Noise Levels
- Ventilation Conditions

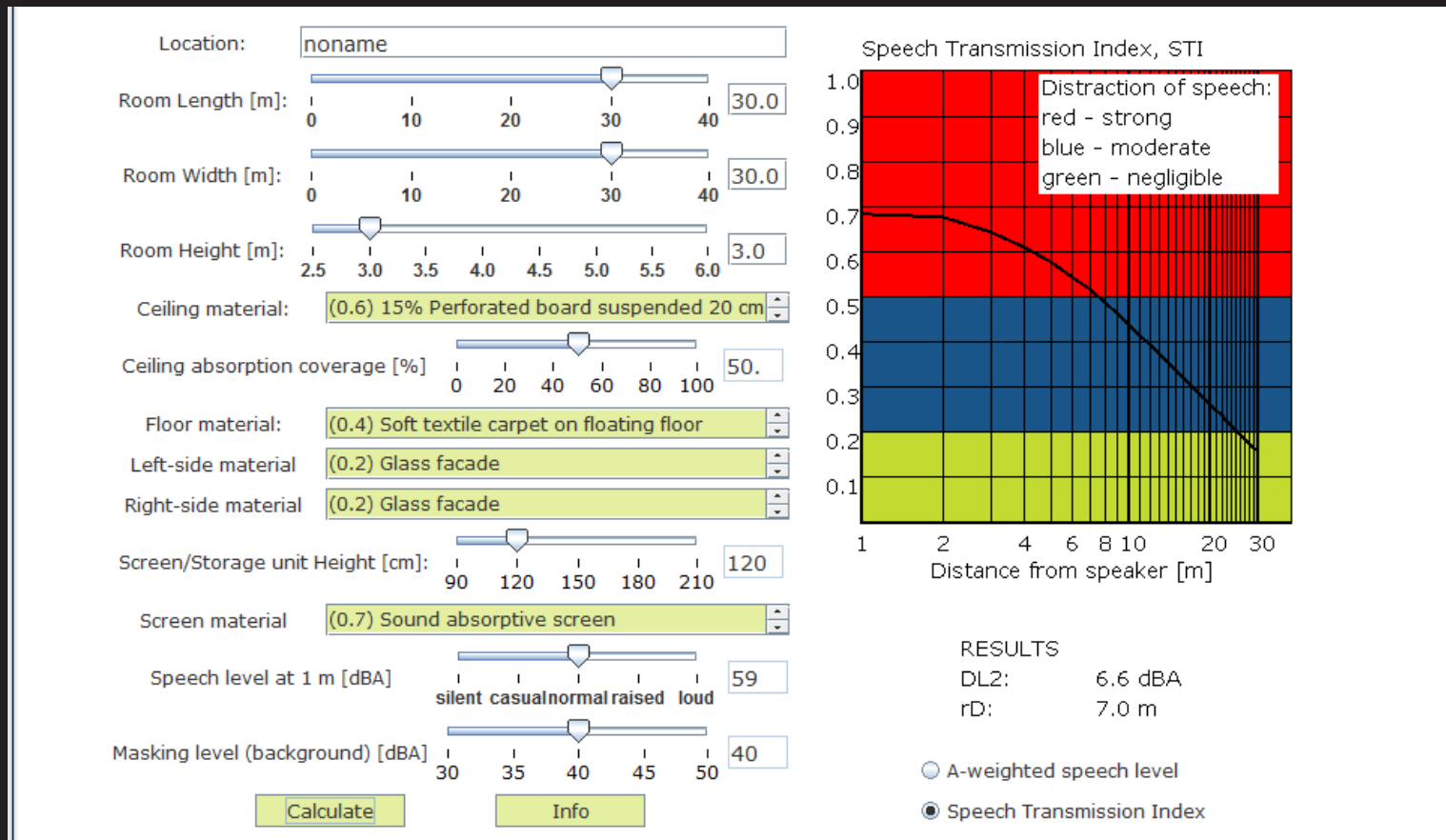
POE QUESTIONS

If you are dissatisfied with noise levels from colleagues in your office, please indicate on the plan provided the area in which the activity of colleagues can cause you disturbance (see example below).



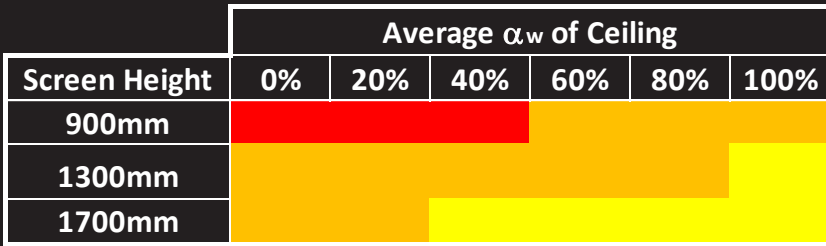
DESIGN APPROACH

http://www.ttl.fi/en/work_environment/physical_factors/acoustictool/Sivut/default.aspx

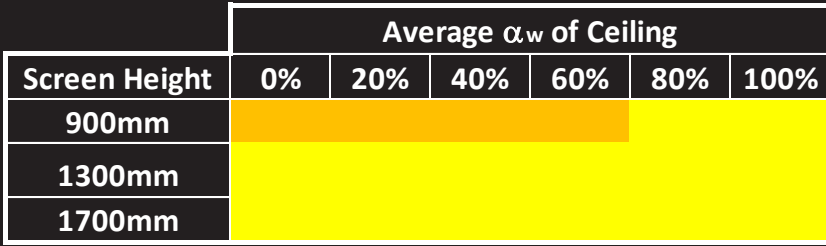


CLASSIFICATION MAPS

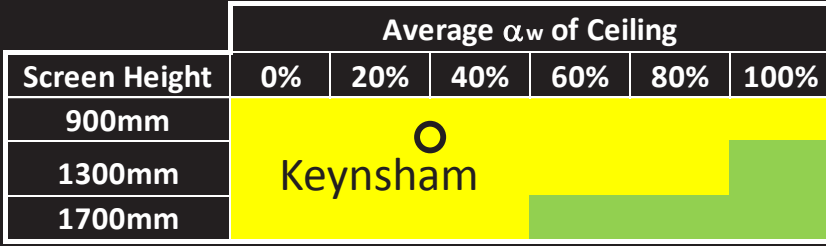
LAF90 = 34dB



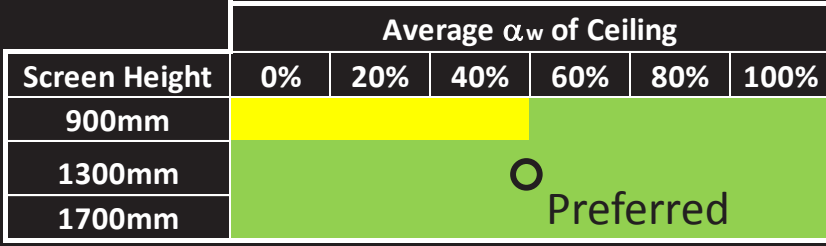
LAF90 = 37dB



LAF90 = 40dB



LAF90 = 43dB



Acoustic Classification

(Finnish Institute of Occupational Health)

Class	r_D
A	<5m
B	5 - 8m
C	8 - 11m
D	>11m

CONCLUSIONS

- Noise ingress - $L_{AFmax} \leq 55\text{dB}$
- Electronic sound masking? – $L_{AF90}=43\text{dB}$
- Average α_w of ceiling ≥ 0.5
- Screen height $\geq 1350\text{mm}$
- Screens can be glazed above 1100mm.