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BUILDING ENGINEERING
SERVICES ASSOCIATION

Building Services:

**Critical systems
for a safe
environment**



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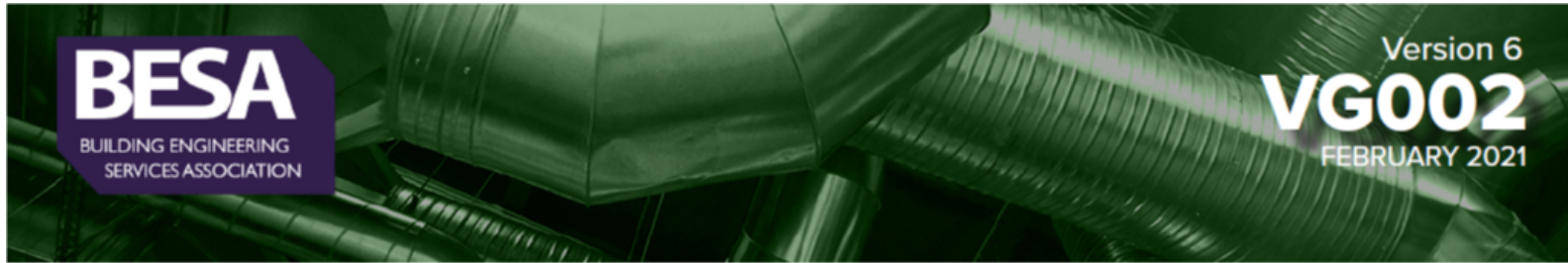
“We spend a lot of time thinking about what we eat and drink, but very little on the quality of air that we breath....”

Nathan Wood, Chair of the BESA Health & Wellbeing in Buildings Group



“This guide is an invaluable non-technical introduction to the issue of IAQ and explains how we can make our own indoor environments safer and healthier for us and our children...”

Rosamund Adoo-Kissi-Debrah, Honorary President of the BESA Health & Wellbeing in Buildings Group



SUMMARY OF PRACTICAL MEASURES FOR BUILDING SERVICES OPERATION

The following information is a summary of the COVID-19 guidance developed by the **BESA** - the Building Engineering Services Association - drawing on guidance issued by **REHVA** - the Federation of European Heating, Ventilation and Air Conditioning Associations with additional content from **CIBSE** - the Chartered Institution of Building Services Engineers and other industry bodies.

FURTHER READING

[BESA COVID 19 Guidance](#) - Guidance and support for members regarding COVID-19 / Coronavirus

[REHVA COVID 19 Guidance](#) - How to operate and use building services in areas with a coronavirus outbreak

[CIBSE COVID 19 Guidance](#) - Guidance for staff, members and visitors

IMPORTANT

- Preventing contamination and protecting public health is more important than thermal comfort.
- All works shall be undertaken with common protective measures including respiratory protection
- The maintenance personnel should follow standard safety procedures of dusty work, including wearing gloves and respiratory protection.
- Where users can intervene in the control of the

OUTSIDE AIR

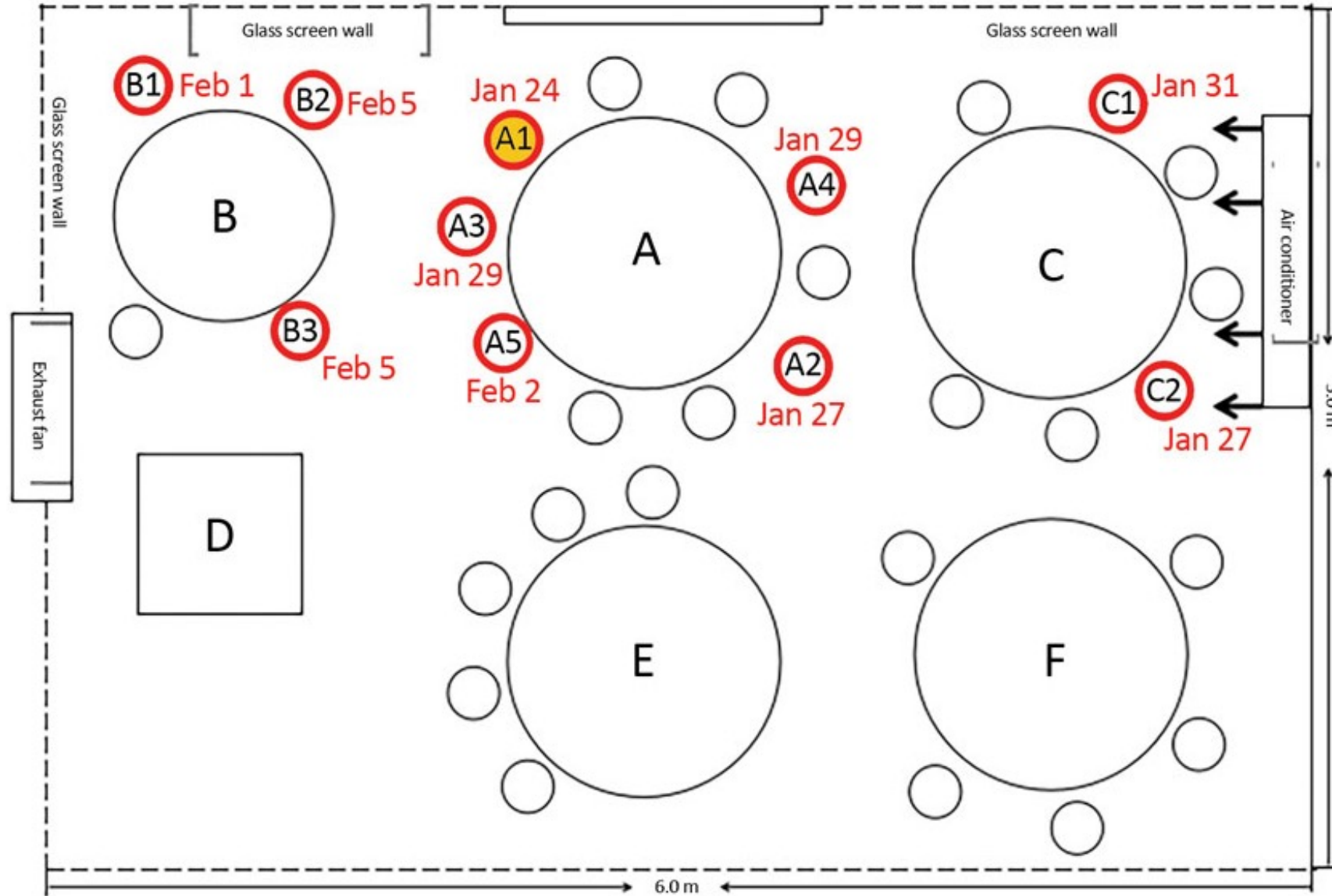
- Maximise the supply of outside air as much as reasonably possible while maintaining or increasing the social distancing (min physical distance 2-3m between persons) among employees in order to foster the ventilation cleaning effect.
- The purpose of maximising fresh air supplies is to dilute the concentration of possible contamination in the indoor air, so any introduction of outside air is to be encouraged,

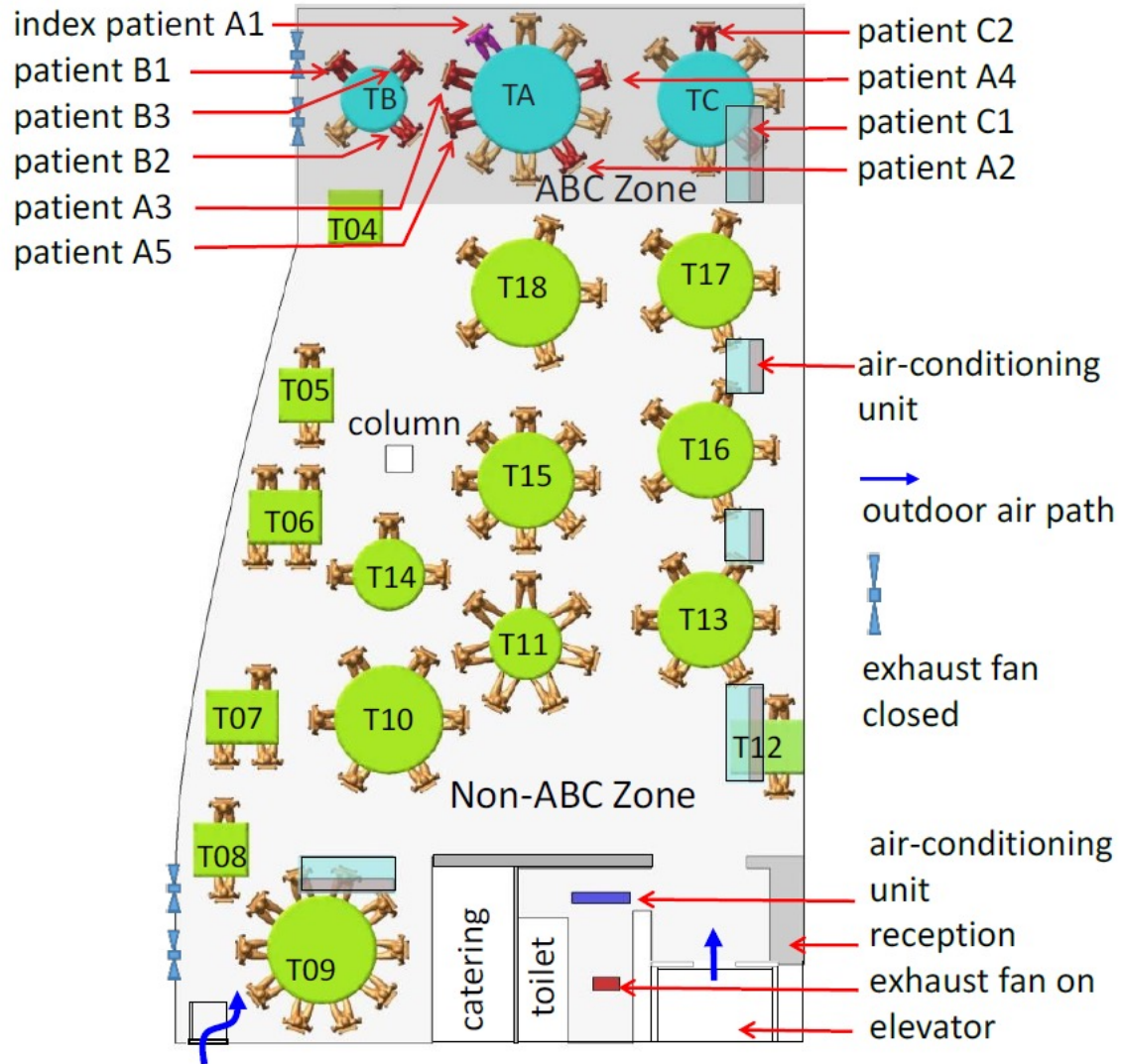
Practical measures for building services operation with regard to Covid-19

Recommending opening of windows where possible – but this only goes so far even when it is possible.

<https://www.thebesa.com/media/1409321/besa-guidance-vg002-2-february-2021-v6.pdf>

Guangdong Restaurant outbreak





The 5 tables in the original sketch were in fact at one end of a larger zone;

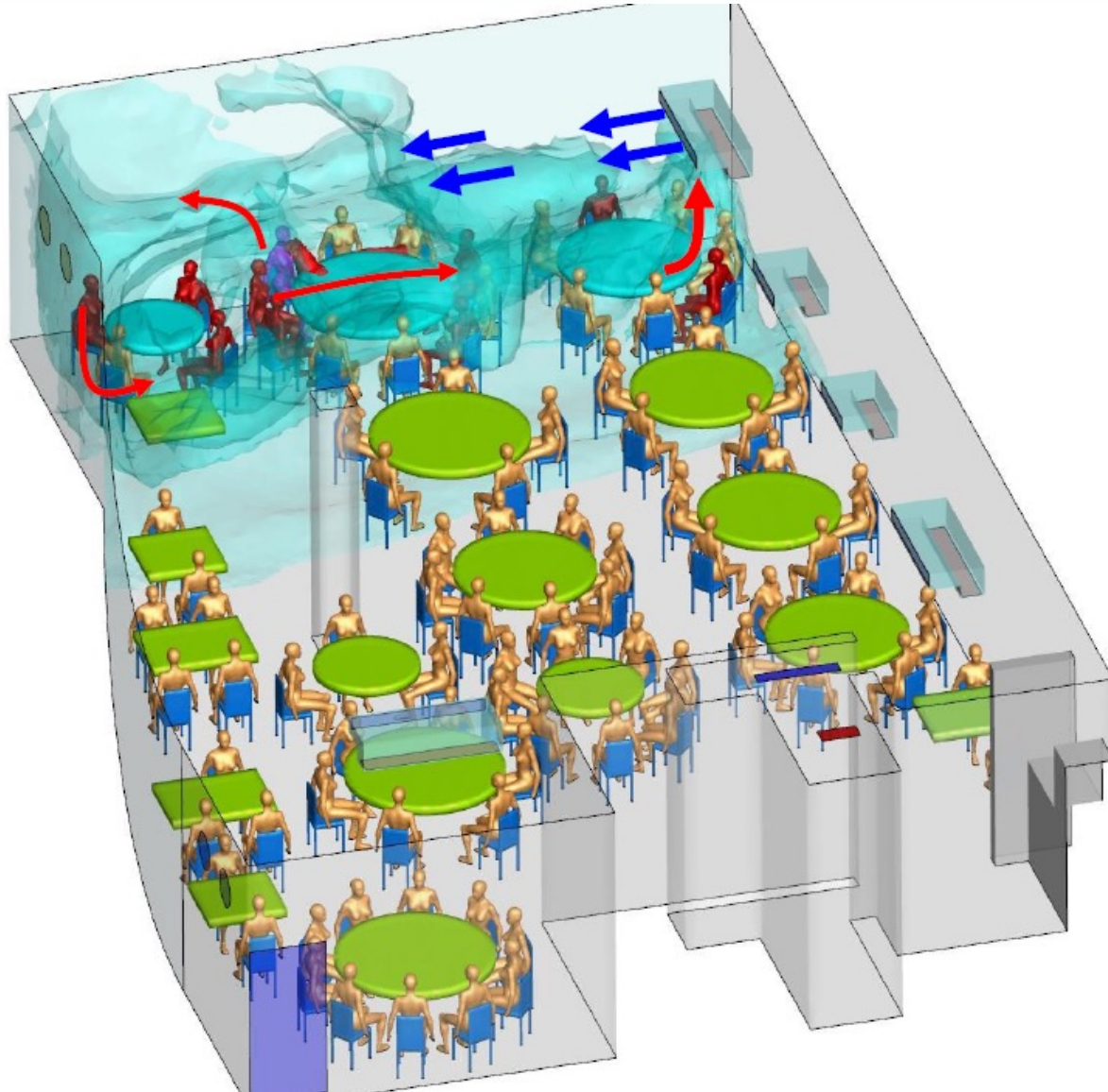
The AC unit was one of 5 in the restaurant;

The extract fans were switched off, as were the fresh air supply fans on the day in question;

No other patrons were infected from other tables;

None of the waiting or kitchen staff became infected;

The only fresh air supply was via infiltration with the limited negative pressure only being created by the toilet extract fans at the far end of the restaurant!



A stagnant recirculating zone at one end of the restaurant was created.

The lack of air movement and, crucially, dilution of infected air allowed the exhaled droplets of infected particles to be transmitted over a further range than the normal expected short-range transmission.

This concurs with previous studies of the WHO and others in previous pandemic outbreaks of airborne viruses.

The study concluded that over crowding and poor ventilation increases risks of transmission:

which concurs with the guidance already issued by ASHRAE, REHVA and The BESA

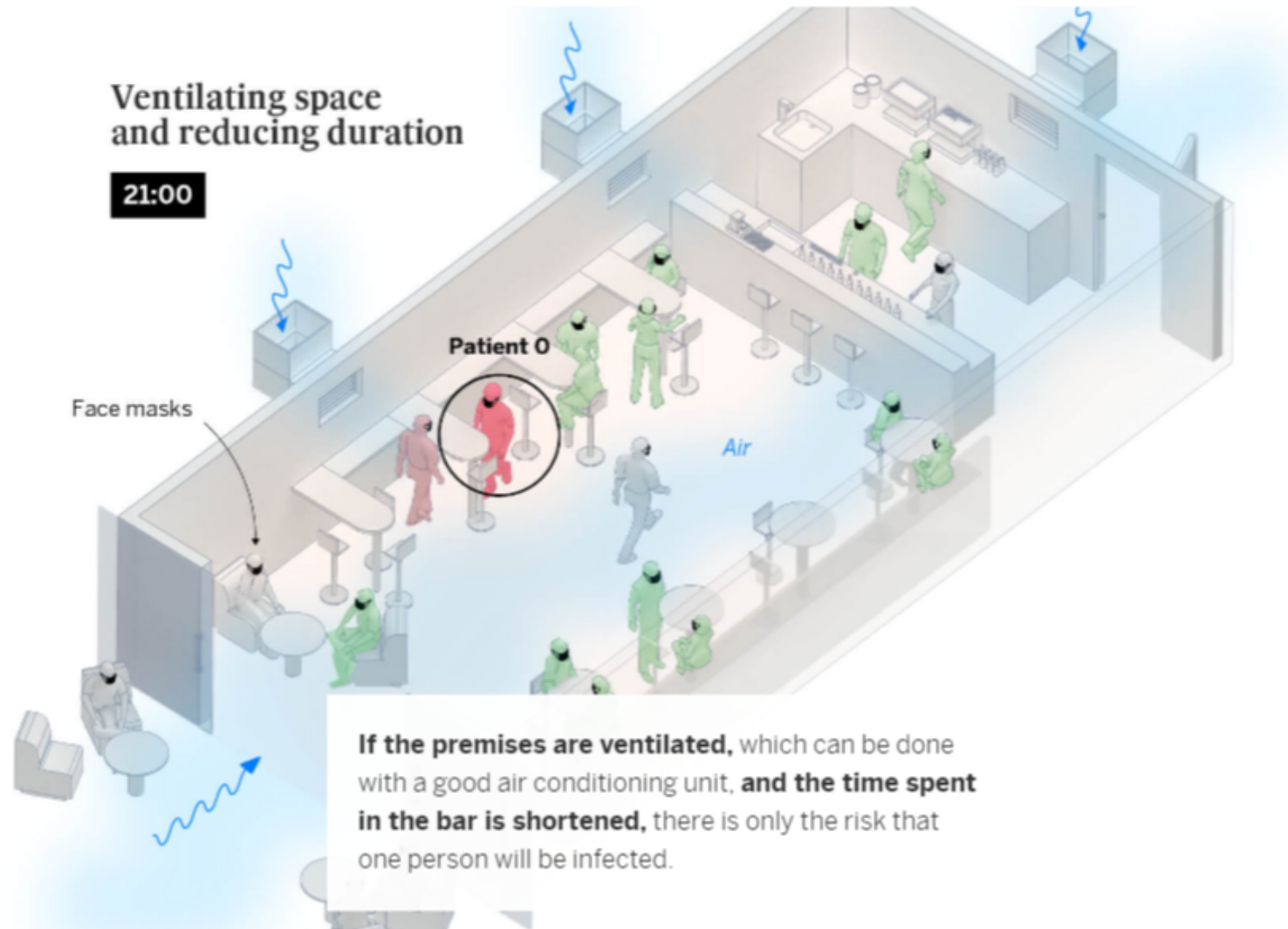
Maximise fresh air volumes to dilute any contaminated air.



A typical public space such as a bar can be shown to expose a high number of fellow patrons if an infected asymptomatic person is present

If no mitigating measures are taken.....

Pictures from El Pais 28th October 2020



That same bar with good ventilation being introduced that will dilute the viral load and massively reduce the exposure of the patrons will see a huge reduction on passive infection rates.

Humidity level concerns:
www.40to60RH.com

Pictures from El Pais 28th October 2020

BESA London 3



BESA Hub
2820004322

 Connected
 SIM

3 Connected devices



BESA 1
2990000554
Last synced: 8 minutes ago

Cloudberry


$\mu\text{g}/\text{m}^3$
1
PM 2.5

ppb
71
VOC

 **41%**
HUMIDITY

 **25°**
TEMP

mBar
1017
PRESSURE

$\mu\text{g}/\text{m}^3$
1
PM1



BESA 2
2930070658
Last synced: 7 minutes ago

Plus


Bq/m³ 24h avg
10
RADON

ppb
122
VOC

ppm
454
CO₂

 **45%**
HUMIDITY

 **25°**
TEMP

mBar
1017
PRESSURE



BESA 3
2930071098
Last synced: 4 minutes ago

Plus


Bq/m³ 24h avg
8
RADON

ppb
71
VOC

ppm
421
CO₂

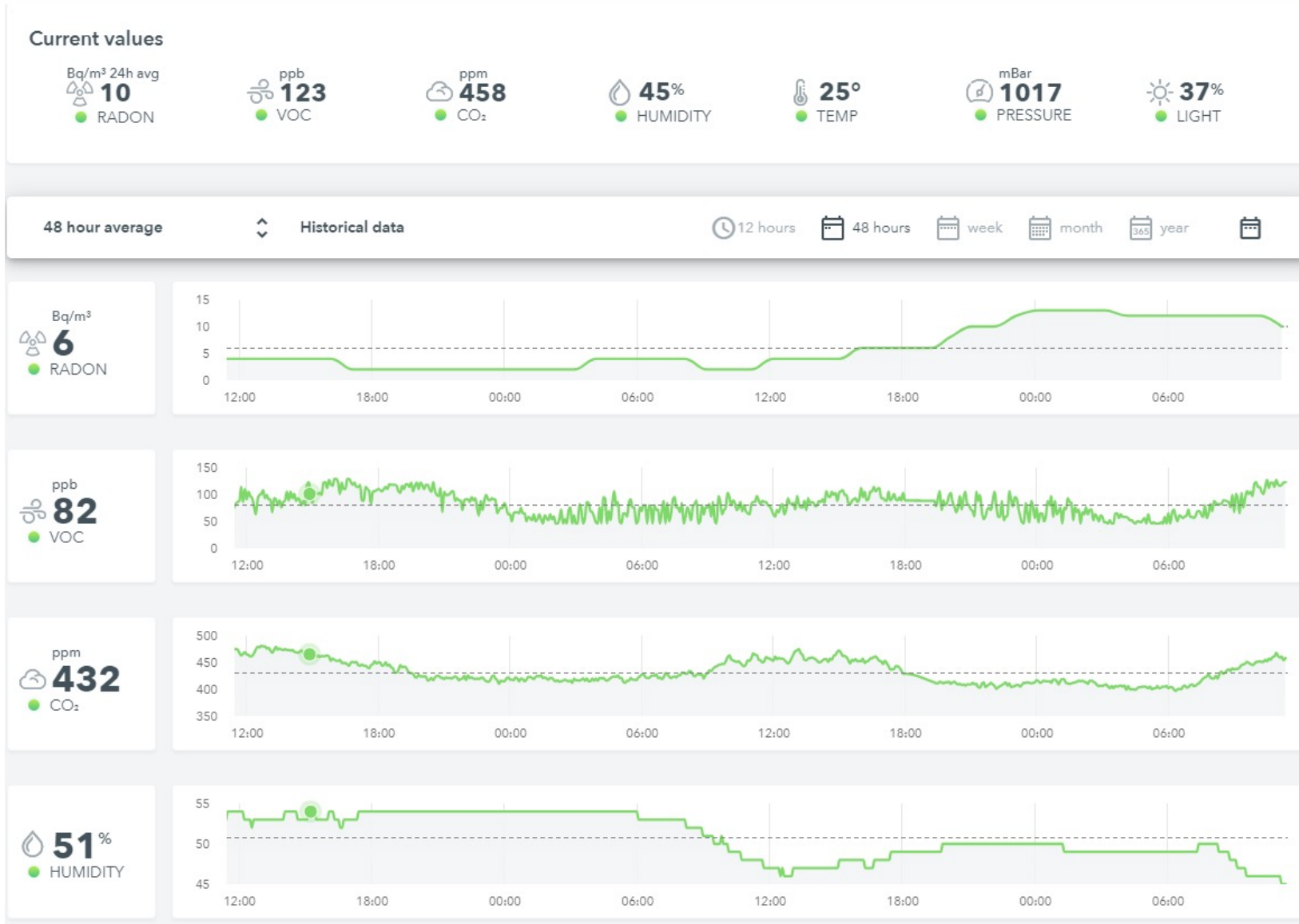
 **55%**
HUMIDITY

 **20°**
TEMP

mBar
1017
PRESSURE



Indoor Air Quality – the hidden dangers



Current values

Bq/m³ 24h avg
1195
● RADON

ppb
48
● VOC

ppm
620
● CO₂

40%
● HUMIDITY

21°
● TEMP

mBar
997
● PRESSURE

14%
● LIGHT

48 hour average



Historical data

🕒 12 hours

📅 48 hours

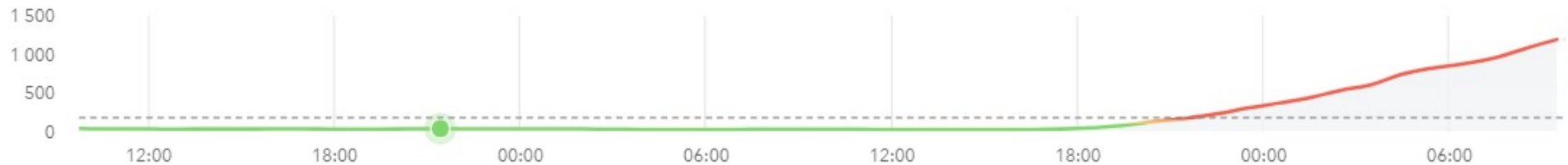
📅 week

📅 month

📅 365 year



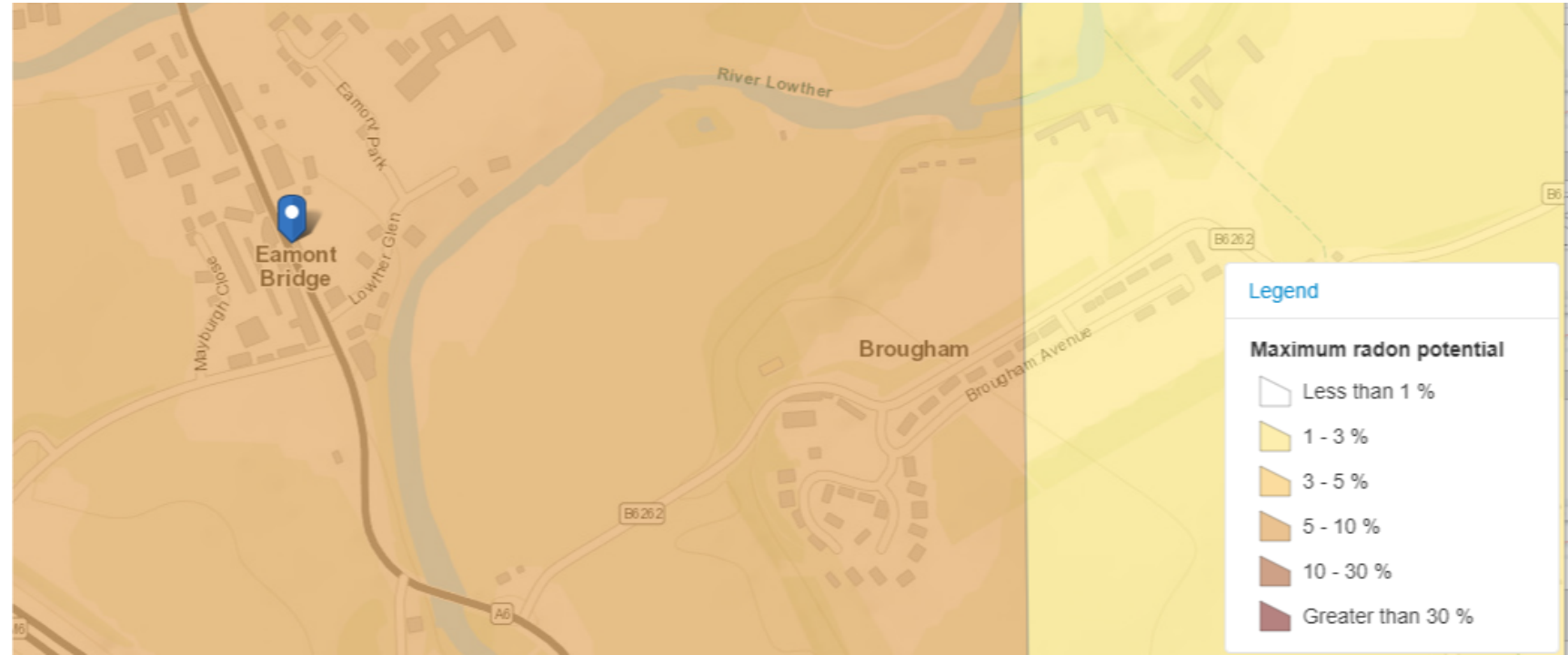
Bq/m³
185
● RADON



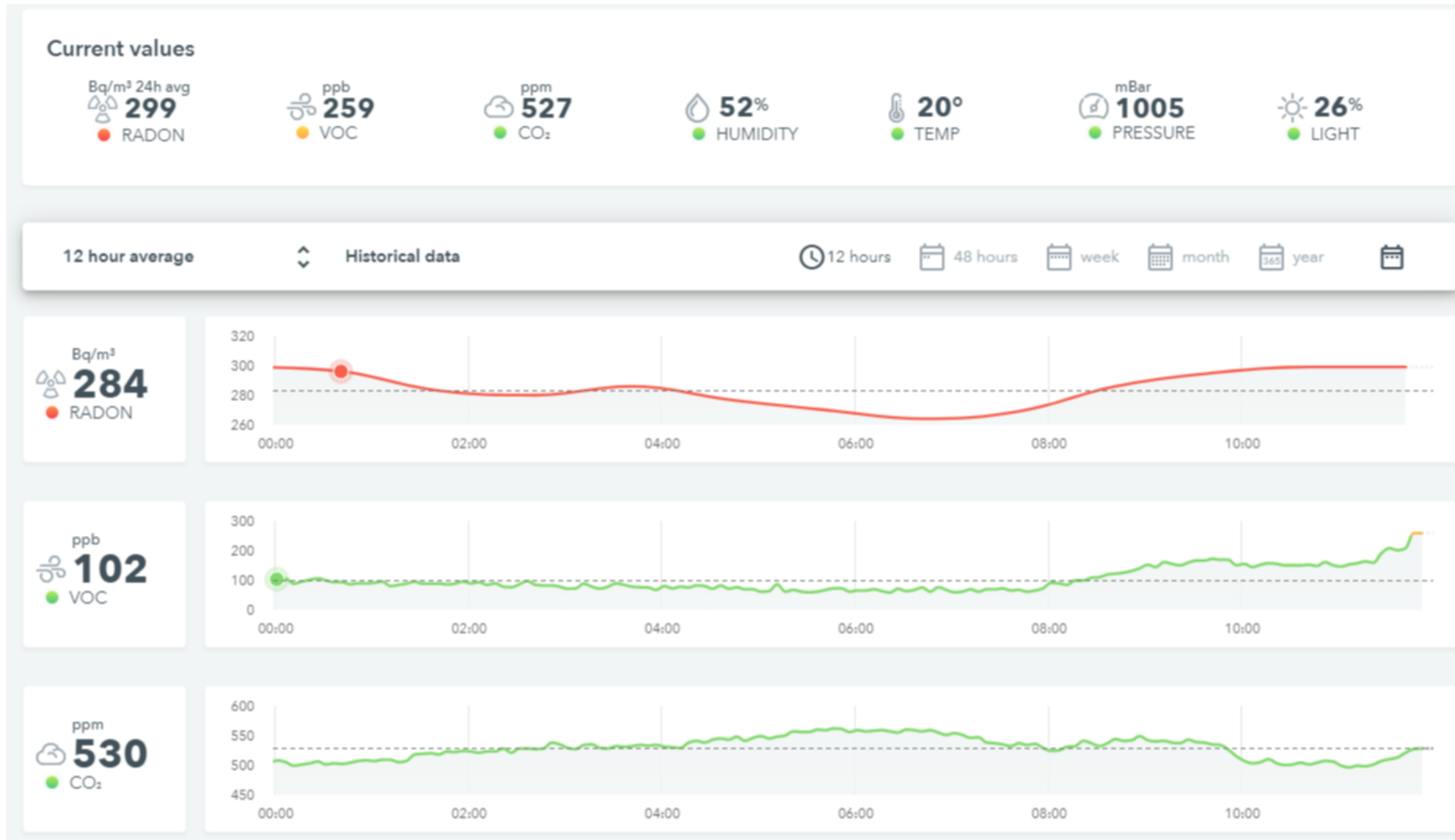
The Ionising Radiations Regulations 2017

The Ionising Radiations Regulations 2017 (IRR17) come into effect where radon is present above the defined level of 300 Bq/m³ (as an annual average) and employers are required to take action to restrict resulting exposures. The HSE and Local Authorities are responsible for enforcing these regulations in particular types of workplace.

Indoor Air Quality – the hidden dangers exposed



Indoor Air Quality – ventilation is the key



Current values

Bq/m³ 24h avg
28
● RADON

ppb
50
● VOC

ppm
414
● CO₂

45%
● HUMIDITY

18°
● TEMP

mBar
985
● PRESSURE

33%
● LIGHT

Week average

↕ Historical data

🕒 12 hours

📅 48 hours

📅 week

📅 month

📅 365 year



Bq/m³
1140
● RADON



Ventilating by opening doors and windows daily has helped reduce levels from 1449 Bq/m² to 853 during the day – proving that ventilation does work
And a drop to a safe level after a weekend of opened windows!

Graeme Fox
Head of Technical

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Thank you.

Questions?

<https://www.thebesa.com/iaq>