



# The BESA Safe Haven School Study

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Nathan Wood



FEARMWOOD  
M&E - VENTILATION

# BUILDING ENGINEERING SERVICES ASSOCIATION

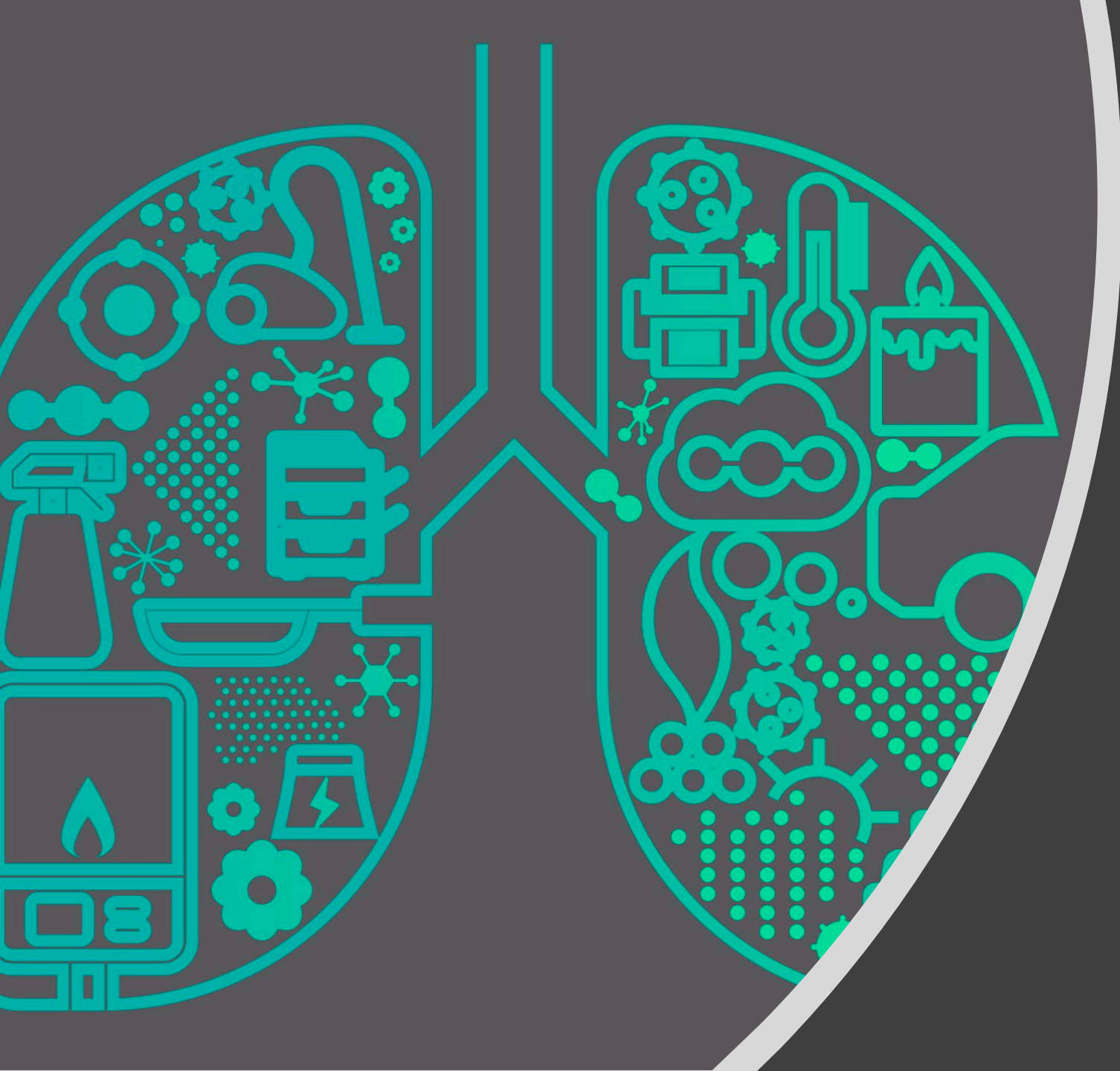
MACE Construction  
CIBSE  
WHO UK Advocate clean air  
Linaker FM  
Camfil  
NAQTS  
BSRIA  
Craig Booth Associates  
Mott Macdonald  
VSS  
DNM Engineering  
EFT Consult  
TFL  
arbnco  
Forsta Projects

Issue 15

# YOUR BESA

FOCUS ON  
Health and  
Wellbeing





# THE GOAL

To develop an IAQ blueprint that any school could look to develop themselves, easily and at minimal cost.

A close-up photograph of a person's hands held out, palms up, in a gesture of openness or offering. The hands are positioned in the center of the frame, with the fingers slightly spread. The person is wearing a light-colored, button-down shirt. The background is a solid, muted blue-grey color. The overall image has a soft, slightly blurred quality.

SCHOOLS RELUCTANT TO TAKE ON THE STUDY



# The Galaxy Trust

CEO Garry Ratcliffe

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- DIY SOS Isle of Sheppey
- MVHR & air quality monitoring
- Family health and wellbeing improved
- Son Curly only hospitalized once in 4.5 years – previously every few months
- Seeing firsthand the benefits of good IAQ, Garry wants the best for his staff and students



There is no “generic” school building



Each school building is unique and has its own strengths and challenges.

- Heating – reliable, unreliable? Gas, oil or electric? Radiators, fans, ceiling radiator panels, underfloor?
- Room size – high ceilings, low ceilings? Painted brick, plasterboard? Statutory size or less?
- Number of children in a class – 25-35

*“There is a uniqueness about school buildings that means one solution will never fit all schools. Oakfield, Temple Hill and West Hill are all distinctive in their character, in their strengths and their challenges”*

“Garry Ratcliffe CEO Executive Head”

**The  Galaxy Trust**



# Schools have NO budget for CLEAN AIR

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Applying for funding is very limited, not a straight forward process

Applications can be refused unless the criteria is met / proved  
(eg cleaner for COVID)

Schools receive very little capital expenditure

Huge financial pressure for the basics – before COVID





# CLEAN AIR PURIFIERS – DIY BOX FANS – SAFE BYPRODUCTS – SNAKEOIL SALES

Pro's Vs con's – Cost – Maintenance – Warranty - Safety





Extract fans – Heat Recovery systems – Air Handling plant

# VENTILATION OPTIONS

# INDOOR AIR QUALITY MONITORS

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- PARTICULATE MATTER PM1.0 PM2.5 PM10
- VOLATILE ORGANIC COMPOUNDS VOC ppm
- CARBON DIOXIDE CO2 ppm
- HUMIDITY %RH
- TEMPERATURE degrees C
- LIGHT %
- PRESSURE mBAR
- OZONE O3 ppb
- HYDROGEN SULFIDE H2S ppb
- NITROGEN DIOXIDE NO2 ppb
- RADON Bq/m3 24 avg



# INDOOR AIR QUALITY MONITORS

aeroqual 

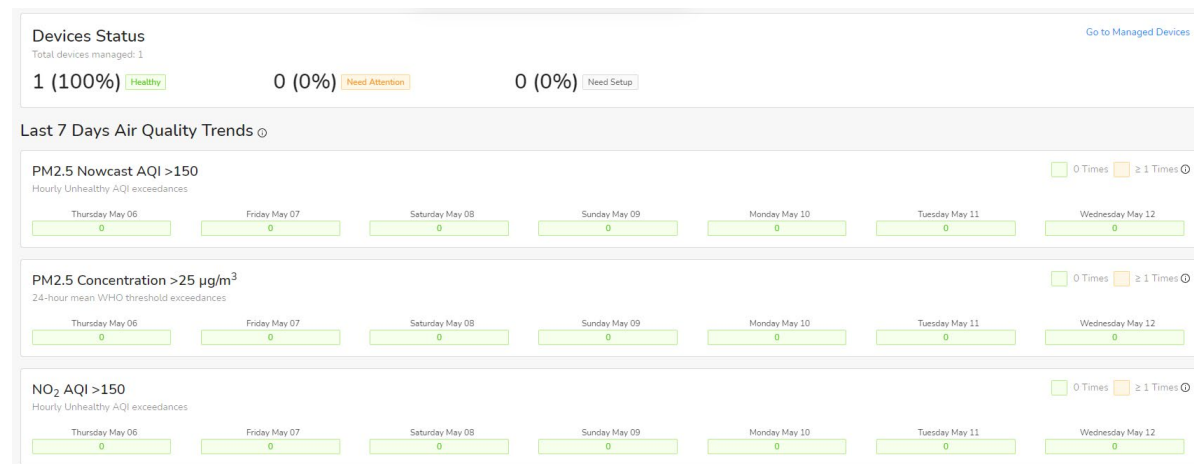
 clarity

- PARTICULATE MATTER PM2.5 PM10
- VOLATILE ORGANIC COMPOUNDS VOC ppm
- CARBON DIOXIDE CO2 ppm
- HUMIDITY %RH
- TEMPERATURE degrees C
- OZONE O3 ppb
- DEW POINT
- NITROGEN DIOXIDE NO2 ppb



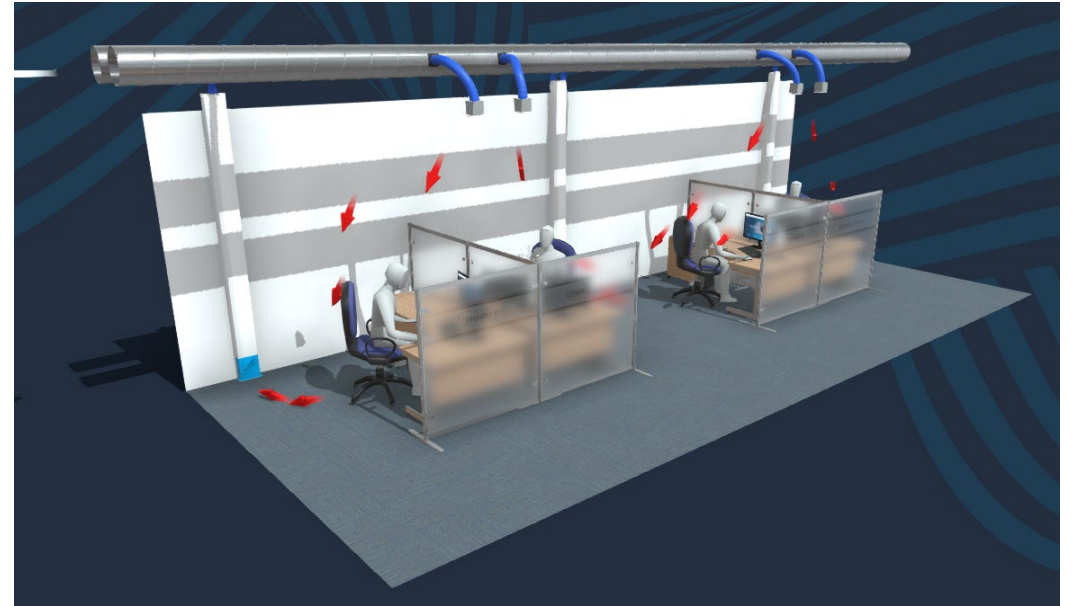
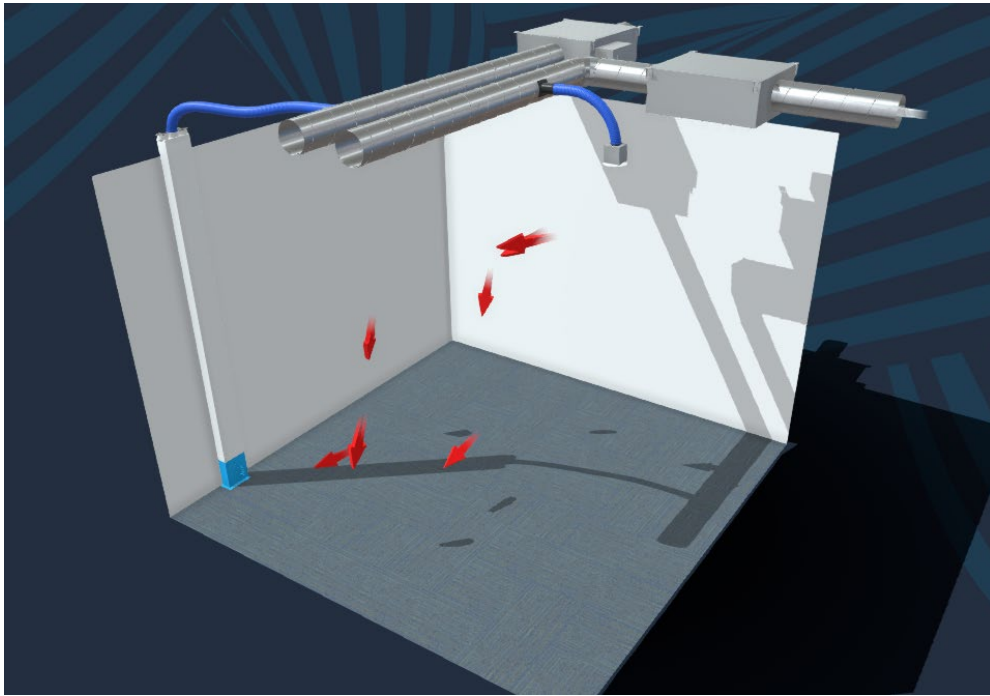
# REMOTE DATA ACCESS

- All the selected air quality monitors have remote dashboard access
- This allows for simple remote monitoring
- Also look to nearest DEFRA station



# Clean room ventilation method

- High supply air
- Low level extract
- Efficient domestic MVHR system
- Ability to use specialist filters such as carbon filters

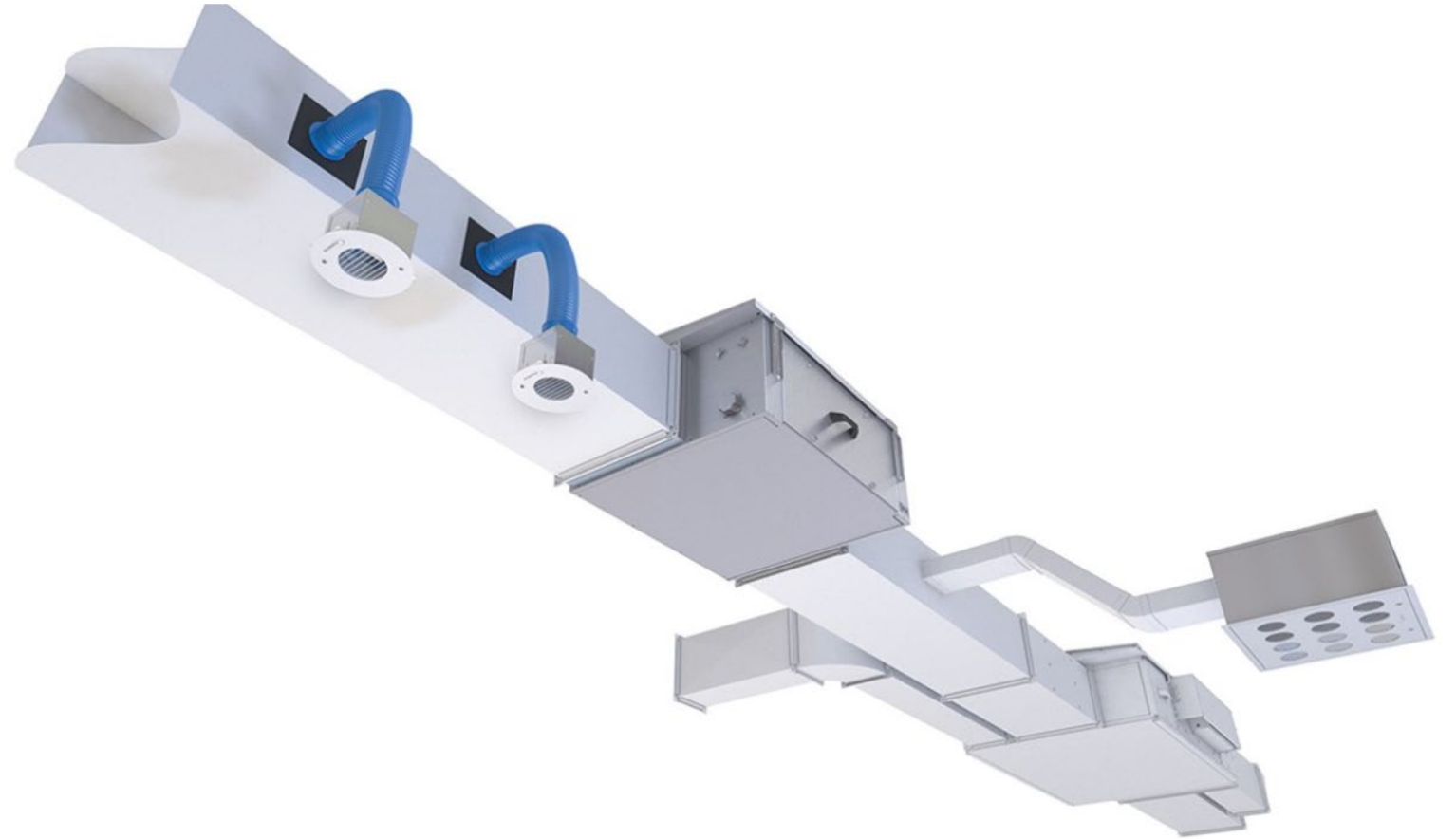




# System design must be simple

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1x MVHR and duct system per  
classroom – with CO2 monitor or  
IAQ monitor



# FOLLOW BEST PRACTICE & BUILDING REGS

Competent installation and materials



DIY system and unknown materials





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# INSTALL & REPEAT

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- Return to sites once the ventilation systems are installed and re run the AQ tests
- Compare before and after data
- Use WHO thresholds (mean averages)
- Identify improvements in IAQ (hopefully)
- look at costs and what could be changed
- Could it be further simplified
- Gov funding – Manufacturer discounts??
- BESA Committee to review and publish




15 minute exposure to ultra fine particles has been proven to remain in your body for approx. 3 months



The particles will pass through the lungs into the blood stream and travel to every part of your body





**IT'S  
NO  
YOLK**

The average loss of lung function in children growing up in polluted homes/ areas could be the equivalent of up to 2 large eggs, varying significantly between individuals.

- King's College London

**AVOID POLLUTANTS - REMOVE SOURCES - REDUCE EXPOSURE WITH VENTILATION**



Thank you!

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