

Marlborough, London, Primary School Case Study

Breathing Buildings was approached by Kier Construction and Consulting Engineers Max Fordham in November 2014 to help with the detailed design of a number of schools funded by the Education Funding Agency (EFA) under the Priority Schools Building Programme (PSBP)



PROJECT	Primary School
LOCATION	Marlborough, London
SECTOR	Education
FEATURES	Design consultancy and implementation
HISTORY	Project began November 2014

The ventilation strategy for all of these schools was required to offer the following:

- Flexibility accounting for different types of teaching space
- A repeatable design that can work with a common façade
- An indoor air quality with a daily average CO₂ level of <1,000ppm and a maximum of 1,500ppm for no more than 20 minutes per day
- Compliance with the overheating criteria of the Facilities Output Specification when using the CIBSE London Design Summer Year weather file
- Compliance with the new BB93 'Acoustic design of schools: performance standards' (February 2015)
- An attractive system inside the room and a grille arrangement which matches the rest of the louvres on the building

Breathing Buildings modelled a number of teaching spaces using their 4DFlo Dynamic Thermal Modelling Software to demonstrate compliance with the FOS.





This is a great example of how our NVHR units can operate with any louvre system. Our flexibility with the louvres allowed the main contractor to use hinged, insulated panels behind the louvres which was cheaper than windows and provided much better free area, allowing them to meet the new FOS and TM52.



Breathing Buildings also used their modelling results to determine the aerodynamic opening area required on the façade to facilitate a single-sided ventilation strategy. Working with the architects, a standardised façade was designed which incorporated the Breathing Buildings NVHR® hybrid ventilation unit(s) and a fixed full height weather louvre within the same module without any manually opening windows. Louvres were selected instead of conventional opening windows due to their ability to provide a greater aerodynamic free area for the particular constraints of the room. Each classroom had a side-hinged insulated door over the louvre that operated in the same way as a window but was able to open wider than windows as there is no safety risk posed of anyone falling out of a louvre! A typical classroom fitted with these louvres achieved an aerodynamic free area of 0.48m² per opening, of which there were two per classroom, whereas if conventional manual opening windows were used with 100mm restrictions the equivalent effective opening area would have been 0.17m².

This would have meant that three of these arrangements would have been required to achieve the same effective free area as a single louvre system.

The flexibility of the NVHR® hybrid ventilation unit makes it possible to fit behind virtually any façade louvre meaning that this solution allowed the architect to design a continuous looking weather louvre as opposed to having a bespoke louvre for the NVHR® and a separate louvre that would look very different.

As part of the compliance testing of the school Max Fordham conducted post-completion acoustic testing of the NVHR® hybrid ventilations units in all of their modes of operation and reported back to Kier that in all cases the winter mixing mode of operation the LA(eq) total measurement was less than the maximum level prescribed by BB93 which is 35dB(A) and in some rooms was as low as 32dB(A) when delivering a total of 160l/s of fresh tempered air.



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