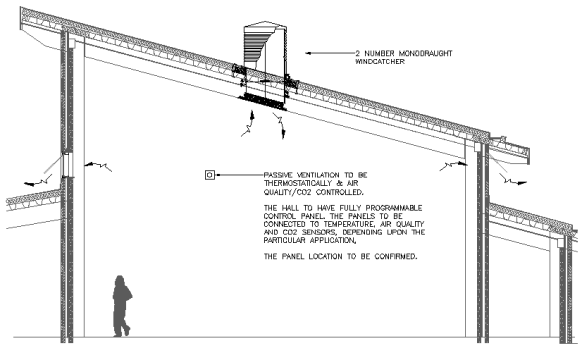
Saughall Primary School, Chester.
**Educational excellences**

A new Church of England primary school costing £5.452 million is to be built in the village of Saughall near Chester.

It follows the approval of plans last year to amalgamate The Ridings Infant and The Thomas Wedge Church of England Junior Schools.
Cheshire's Executive put in place the finance for the scheme which also includes a contribution from the schools involved.
Lead member for Children's Services County Councilor David Rowland's said:
"The amalgamation of the infant and junior schools is in line with our Transforming Learning Communities policy to create all through primary schools."
"Neither school is large enough to accommodate 280 pupils and extending either of the existing buildings is not considered a viable option.
"Therefore the proposal is to build an all – through voluntary controlled primary school, providing ten classes on land in the grounds of the junior school.
"Work will begin on site in July with the new school opening its doors to pupils in September 09."




HALL VENTILATION SCALE 1/50

*Ventilation*
Windows are a cost effetive, efficient and sustainable solution to fresh air and climate control in schools, when used properly.

You don't need expensive fans or stacks to ensure school children get enough fresh air. Well-designed windows perform equally well and for a fraction of the cost.

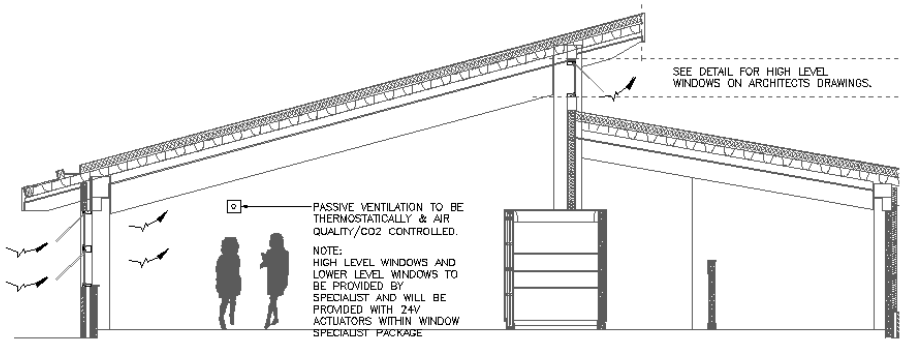
First lesson after lunch; the classroom is warm and stuffy. It is an all-too-familiar scenario that designers of a new generation of schools are trying to avoid.

Technical guidance has been redrafted and huge effort is being put into ventilation design to ensure that there is adequate fresh air and that classroom temperatures are neither too hot nor too cold.
Looking at the existing stock of school buildings, in many classrooms, when the windows are closed, CO2 concentrations routinely go above 2000ppm. The healthy maximum is 1000ppm, and CO2 concentration should never go above 1500ppm.

Various pieces of legislation stipulate ventilation rates ranging from a continuous minimum of 3l/s per person to an occasional maximum 8l/s per person. To achieve these rates, designers are frequently incorporating fans into classroom designs. Stacks feature in some designs, taking advantage of buoyancy circulation to drive airflow.
Each child in a classroom gives off heat equivalent to a 65W light bulb and each adult the equivalent of a 100W bulb. The columns of warm air rising from each pupil draw in fresh, cool air through the bottom of the windows, where it falls to the floor, while warm air laden with CO2 is purged through the top of the windows. With a couple of exceptions, there are three windows per classroom.

Thermal models of the schools were developed and possible trouble spots identified. There were rooms with higher occupancy, rooms that were deep plan, and rooms with only two, rather than three, windows. Computational fluid dynamics modeling was carried out to explore in more detail how these rooms would perform.

With the aid of automatic actuators linked to CO2 and temperature we will reduce CO2 and improve the working condition.




TYPICAL CLASSROOM PASSIVE VENTILATION SCALE 1/50

*Air tightness*

With emphasises that the key to efficient passive ventilation is making the building fabric as airtight as possible. The Part L air tightness standard is set at only 10m3/hr per m2 of building fabric at 50 Pascal's. Meaning this could be improved upon to save energy.

Thermal models suggested that going from 10m3/hr to 7.5m3/hr produced a 10% energy saving. And from 7.5m2 to 5m2 saved another 5%.

The external cladding of the building isn't always the way to improve the buildings overall air tightness for instance, better contact points where walls meet the roofs and proper sealing of drilled holes in the cladding, ensuring this you can lower the actual air tightness to around 6m3/hr which is 40% lower then the Part L specification of 10m3/hr.

Improving the air tightness of the building also has its merits of improving the acoustics, as well as helping to maintain temperature stability.

*Sun Pipes*

Sun Pipes can help to reduce this by eliminating the need to use electric lighting during daylight hours. At the same time the Sun Pipes offer considerable environmental and health benefits by creating better indoor working conditions.

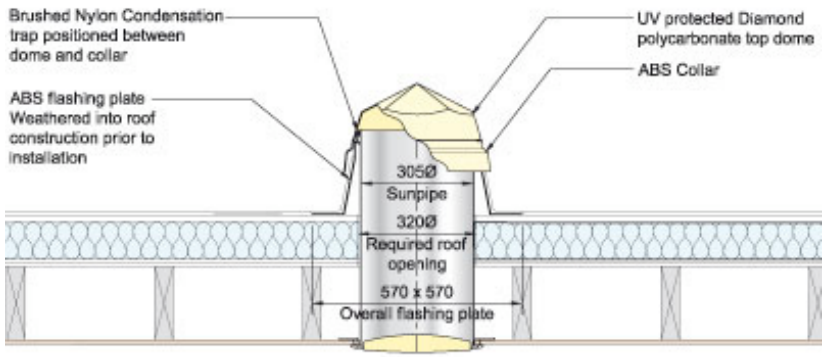
**•Enables 4% daylight factor to be provided to suit deep plan classrooms.**

**•No solar gain in summer months, or heat loss in winter as compared to conventional roof lights.**

**•No maintenance inside or out.**

**•Children and teachers work better under a natural light environment.**

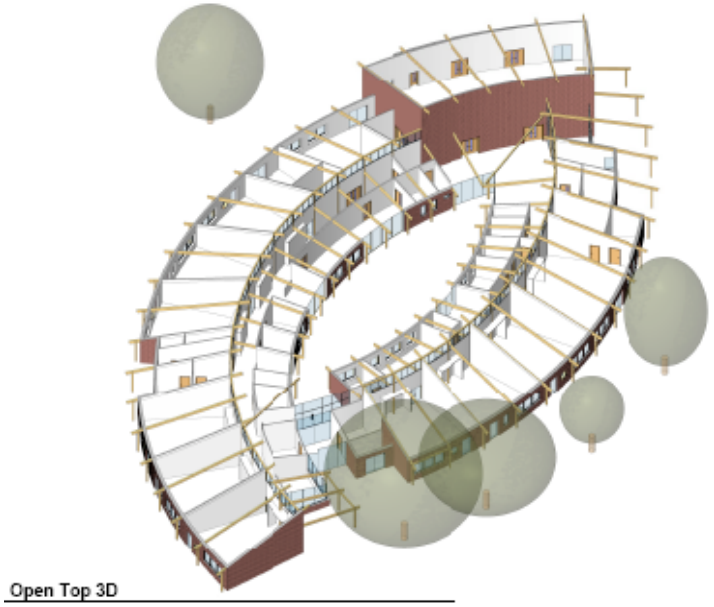
At least 75% of electricity costs can be saved during the daytime, where Sun Pipes are used to replace the need for electric lighting during School hours.



*Heating*

To heat the school the decision was made to use Radiant Panels fed via a LPHW circuit operated via a Biomass Boiler.

The advantages of using radiant panels are that there are no noise issues with them and also due to them being ceiling mounted they are very unobtrusive.


*Energy Analysis/Breeam*

The Primary objective of Saughall is for it to be a Low Carbon Learning centre with the main goal of the scheme to become the first BREEAM excellent rated building in the United Kingdom. And with the pre-assessment of the building coming in at a score of 78% (Excellent) this looks extremely promising.

With the use of the Biomass boiler alone this school will be saving a total of 12.5 tonnes of $CO_2$ a year.