



in partnership with



CAROLINA BLEY

Trent Basin Primary School



Central atrium

DESIGN PHILOSOPHY

The Trent Basin Primary School is a real-life design project for a new sustainable community in a regeneration area and its surrounding neighbourhoods. The school concept, developed to fit within the Trent Basin sustainable housing development, is to provide a high-quality learning environment for children, as well as a low energy sustainable building that meets Passivhaus standards and its part of the Trent Basin community energy scheme. Hence, the school will not only benefit from the energy generated and stored in the community, but also will contribute to its generation through solar PV tiles installed on the south facing roofs. Finally, the design is more focused on the interior spaces, therefore, the external envelope is a simple high-performance shell that gives shelter to comfortable classrooms with fresh air, good daylight levels and adequate temperatures, along with a playful central atrium with fluidly designed corridors and partitions made of wood strips that create a variety of spaces where kids can develop creativity and the ability to interact with others.

PROJECT FACTS

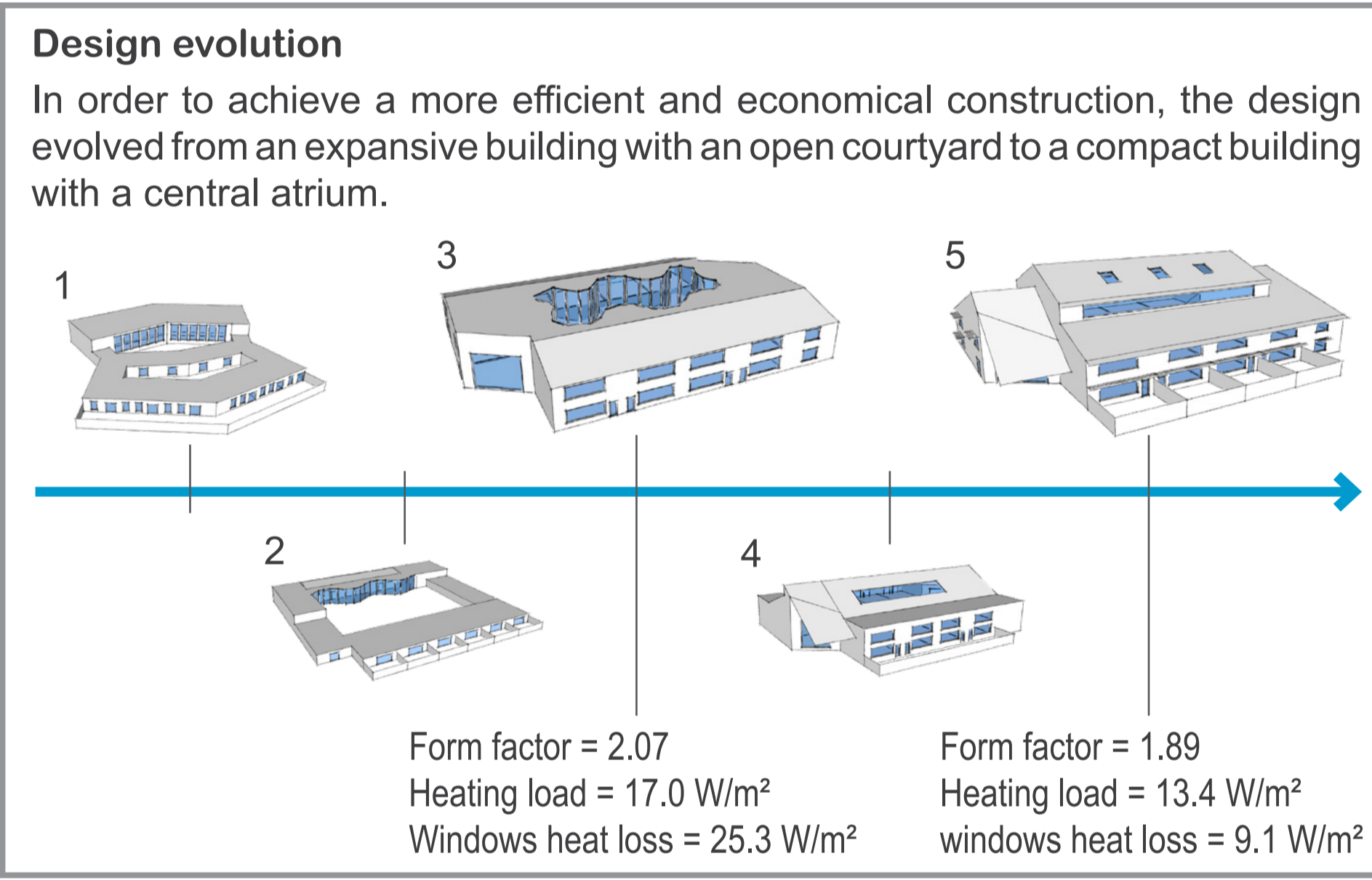
Educational Building Use	Nottingham Location	2,447 m² TFA
------------------------------------	-------------------------------	-----------------------------------

PASSIVHAUS STRATEGY

Throughout the design process, environmental design principles were integrated, backed up by performative analysis. Accordingly, the design evolved from a spread-out building with a courtyard to a compact building with an expressive central atrium that performs a number of functions. The central atrium is a key feature of the design because it works as a collective and social gathering space, as a distributor of daylight and as a crucial part of the ventilation strategy. Initially three main steps were taken on the design process. At first, a South-North orientation was chosen to maximize the heat gains during winter and control them during summer. Secondly, a few design concepts were investigated and analysed with the aim of achieving better building thermal performance. The chosen design combined a building of small form factor, balanced openings appropriately positioned to provide adequate daylight levels, and a thermal envelope that was detailed designed to ensure a continuous path around the building in order to minimise thermal bridges and obtain an efficient airtight and insulated envelope. Thirdly, fixed horizontal shading devices were appropriately designed in the south and west facades to deliver shading during summer months while allowing the solar radiation to reach the windows during the winter months.

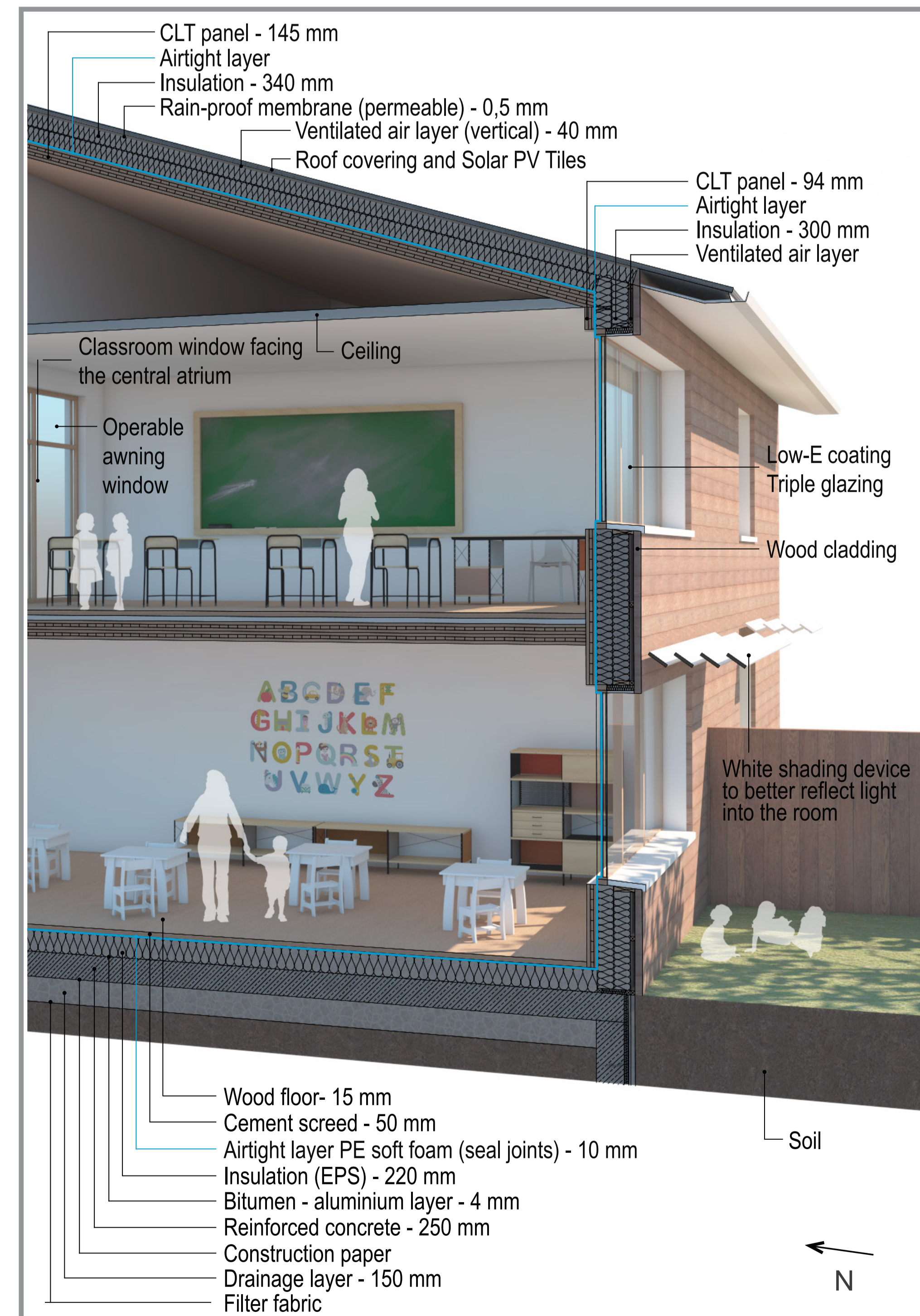
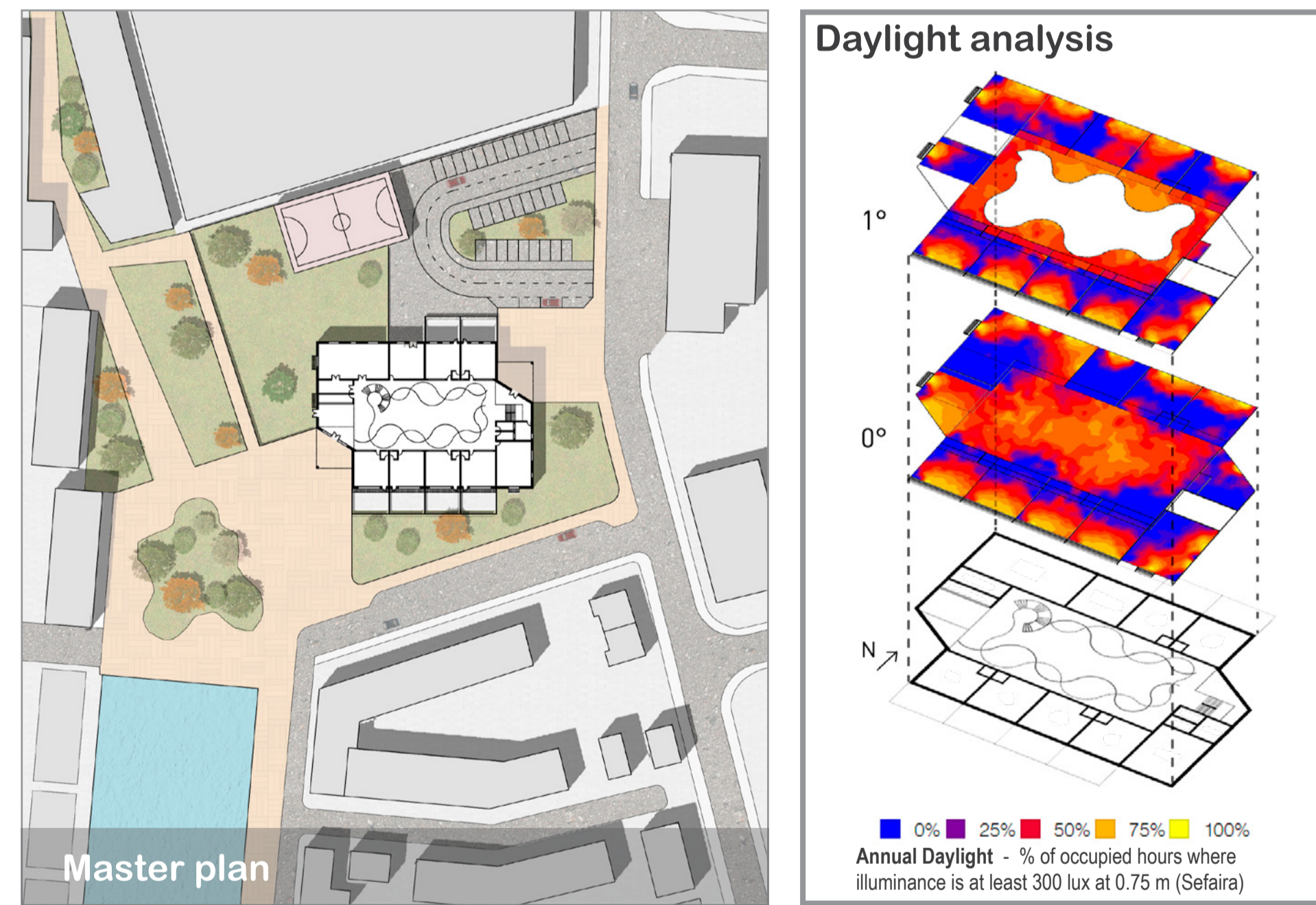
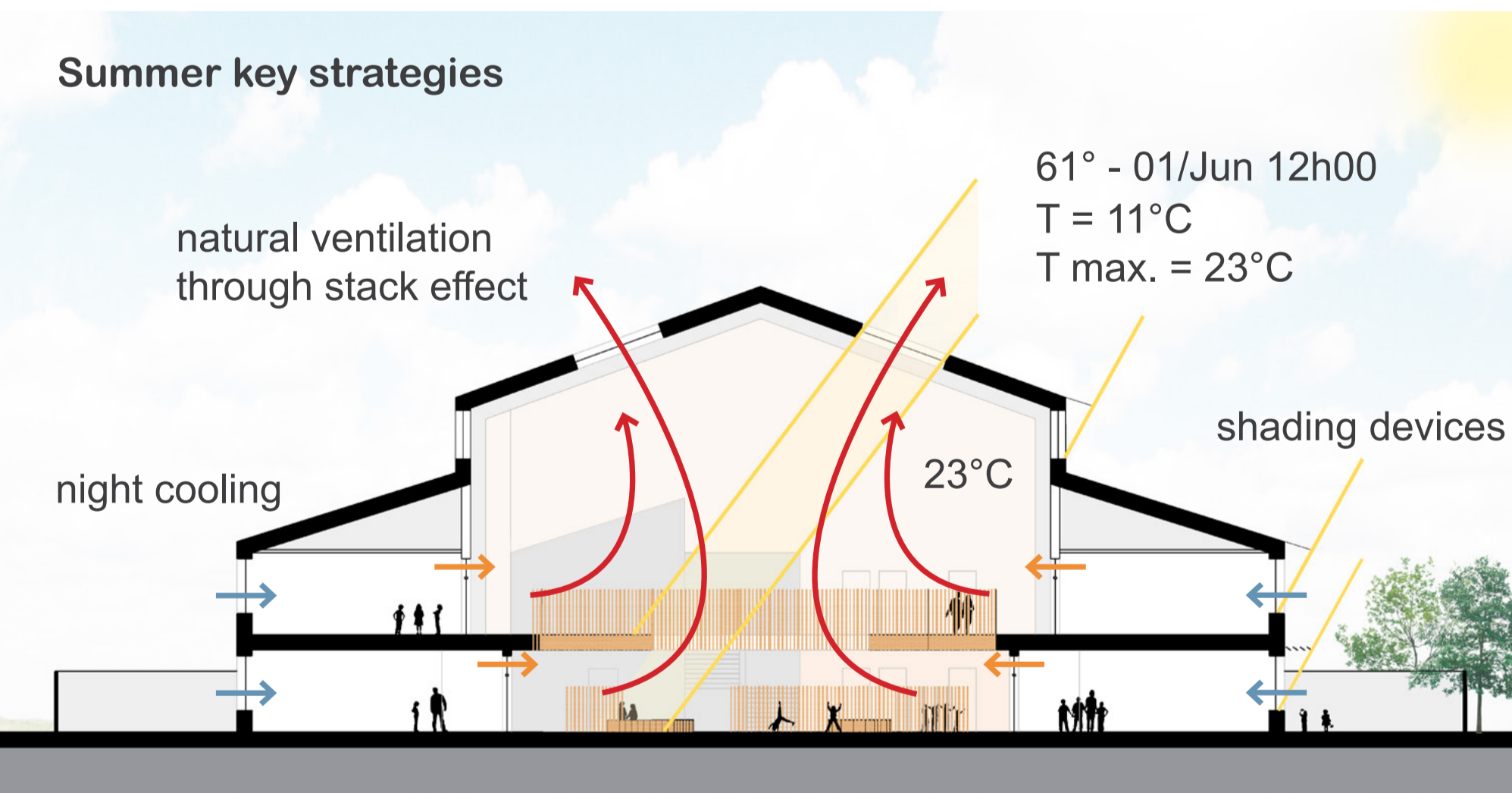
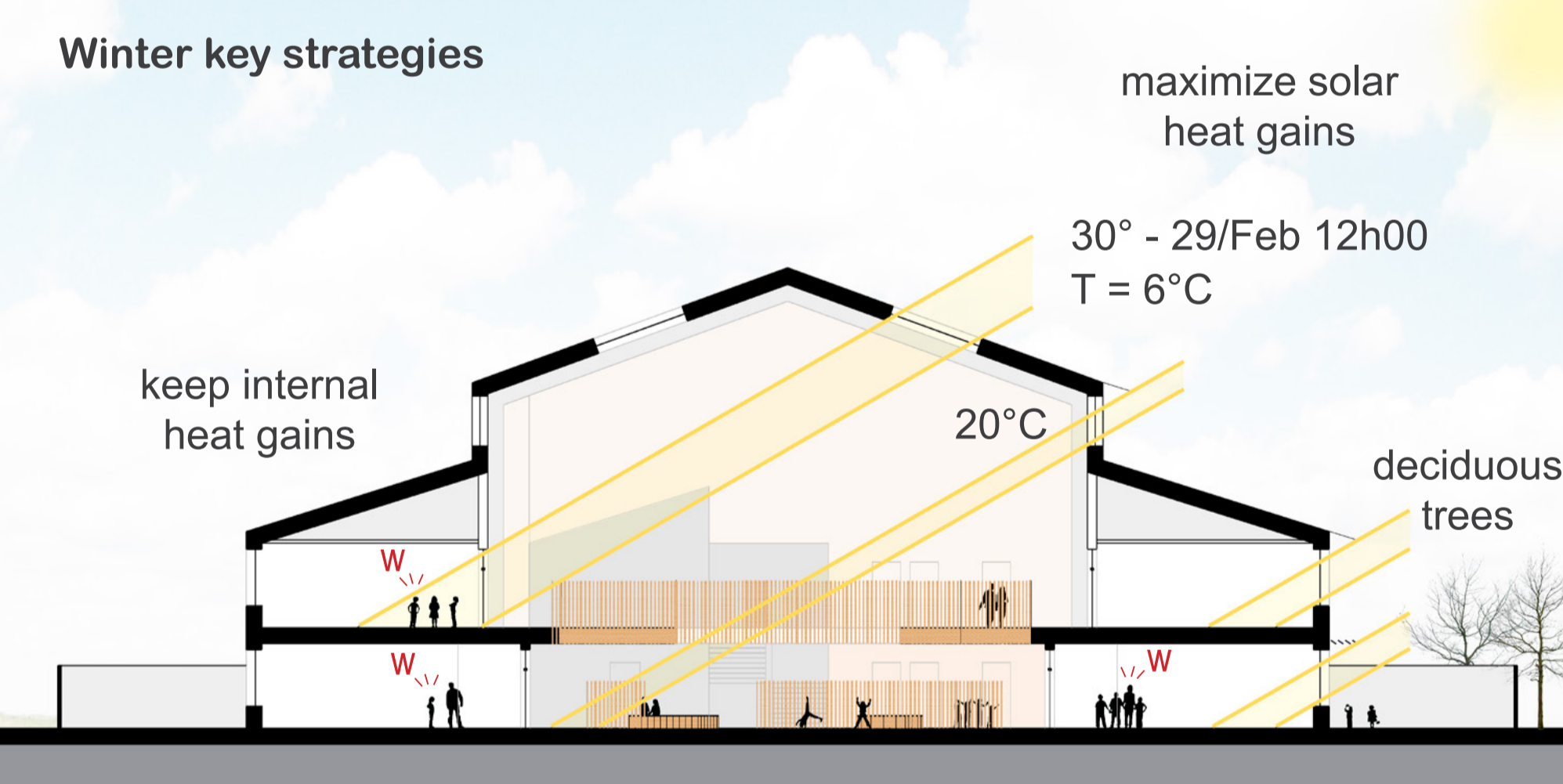
PREDICTED PERFORMANCE

Walls 0.12 W/m ² K Floor 0.15 W/m ² K Roof 0.12 W/m ² K Windows 0.80 W/m ² K	9.1 w/m² Heating Load	1.89 Form Factor
---	--	----------------------------



MATERIALS

The main concept was to adopt materials of low embodied energy and carbon footprint, sustainable and easy of dismantling for maintenance or replacement. In this way, the main structure consists of CLT (Cross Laminated Timber), because beyond its environmental qualities it is a prefabricated material that helps to deliver the predicted performance, reduces variability on the construction and thus reduces building time.



Acknowledgements

Sustainable Design Studio - ABEE4045
Tutors: Lucelia Rodrigues and Lorna Kiamba



UK PASSIVHAUS STUDENT COMPETITION