Passivhaus Documentation

Stand alone early years (4-5 year old) class room

PassivClass, Smallwood School, Tooting, London, UK

Project ID 4417, www.passivhausprojekte.de

2.1

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PassivClass started on site in late July 2014 with completion in September 2014. Passivhaus certification was awarded in January 2015.

The building is of modular construction with approximately 60% of the building's material by weight being re-claimed from old modular buildings.

Key features: Timber stud construction with in-board PIR insulation, reclaimed structural elements, lean mechanical design with point of use water heaters and exposed services, MVHR system with duct heating.

U-value external walls 0.099 W/(m²k)

U-value floor 0.111 W/(m²k)

U-value roof 0.069 W/(m²k)

U-value window 0.934 W/(m²k)

PHPP space heat demand 15.2 kWh/(m^2a)

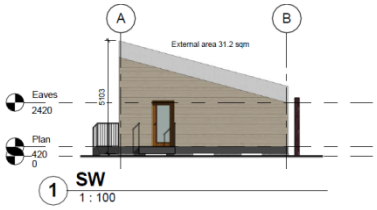
PHPP primary energy demand 103 kWh/(m²a)

Pressure test n_{50} 0.349 h^{-1}

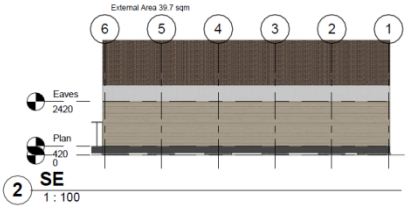
Heat Recovery 86.6 %

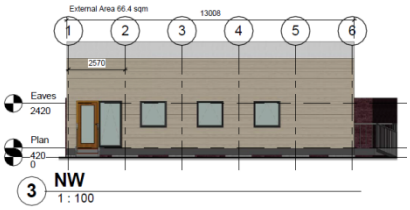
2.2 Brief project description

PassivClass is a stand-alone facility which provides a large open plan teaching space with hygiene facilities for the teachers and pupils. The project was instructed on the 15th May 2014 with practical completion achieved on the 2nd September 2014. This period allowed for planning, detailed design, procurement via competitive tendering and construction. The short project timeline was achieved using a modular building system and a lean approach to mechanical design.

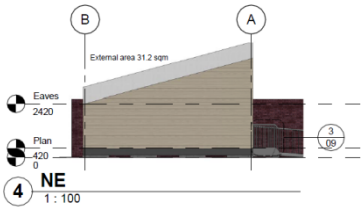


The site is located within the grounds of Smallwood Primary School South West London. A simple design of a 'box' with a pitched roof was used to allow for rapid construction and maximum useable building volume. A sectional 2.7m bay floor plan was adopted to allow readily available floor and roof cassettes to be used in the building. The opportunity to re-use materials from ex-hire modular buildings was also grasped to enhance the sustainability of the construction approach.

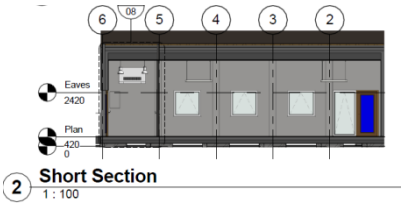




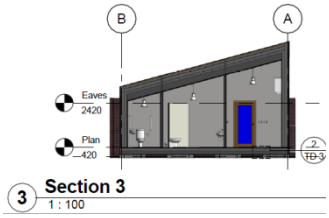
The form of the building meant that very low U values had to be met due to the high surface area / internal floor area ratio. The bulk of the additional insulation required was put into the roof structure to reduce the loss of floor space from additional wall thicknesses.



The building has a suspended timber floor with steel floor beams support each floor cassette section, the roof cassettes comprise of glu-lam beams support intermediate roof joist, the roof cassettes are supported on steel beams which repeat at 2.7m intervals inside the wall section.

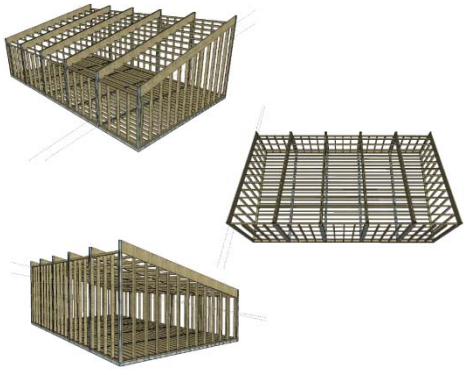


Much of the bulk of the insulation is in-boarded to the construction of the building. Thermal bridges were identified due to the nature of the modular construction and were either totally eliminated by local over cladding of insulation or quantified and allowed for in the PHPP calculation.



The building rests on pad foundations that support the corner and outside centres of each of the floor cassettes. The pads are 1.5m concrete cubes and represented the most cost effective foundation solution.

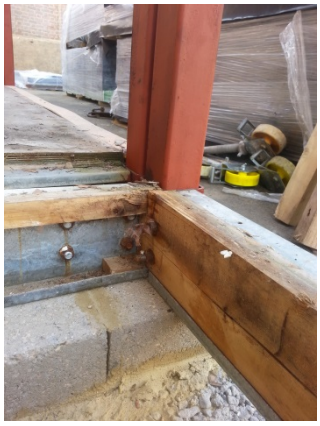
Originally re-usable screw piles were considered but were discounted on the basis of cost. Concrete pads worked out to be a tenth of the cost of screw piles.

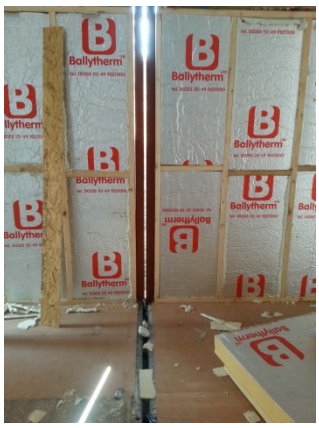


2.3 Elevations

2.4 Internal views

2.7.2 Floor construction photographs:





2.8.1 Wall Details

The walls are of timber studwork with PIR between the studs and fixed to the inside face of the walls. Internally the walls are clad with OSB, an air barrier and plaster board. Externally the stud work is protected by a Tyvek vapour barrier and clad with red cedar.

A 1200 gauge polythene air barrier is stapled to the face of the OSB. All joints and fixings in the air barrier are sealed with air barrier tape.

All services are surface run and screwed through the plaster board into the OSB behind. Each screw penetrates the air barrier but then closes the hole by compressing the opening.

The drawing opposite shows the connection arrangement between the roof glulam beams and the steel column running through the walls.