

Wootton Wawen – Passivhaus Scheme of 14 dwellings for Esha Developments / Waterloo Housing

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The company has extensive experience of delivering Passivhaus schools, usually built using a timber frame solution. When we started to carry out our due diligence on the tender information for Wootton Wawen, and realised that the proposal from MWK Architects was to build in traditional masonry, we were interested to learn more.

As the tender process progressed, and we met and discussed the building envelope with MWK's Dominic Kramer, and the Client's Passivhaus certifier, Co Create's Will South, it became apparent that the Passivhaus standards could be more easily achieved using a super-insulated traditional masonry approach.

The keys to achieving the enhanced U-values required for Passivhaus are to be found in the ground floor slab design, the junction between the ground floor and external wall, enlarged cavities tightly filled with insulation (leaving no gaps above 2mm) and very careful attention to air-tightness and build quality.

We found as we developed the design, some very smart ways to achieve the objectives of very low thermal bridging.

For the Wootton Wawen project this is achieved in a number of ways:-

- 1) 400mm thick 'Floormate' floor slab insulation – this is a PIR foam insulation with greatly enhanced thermal insulation characteristics, and forms a 'raft' onto which the concrete floor screed is laid, which helps to make the floor slab air-tight.
- 2) Marmox 'Thermoblock' blocks are used as the starter course for the internal masonry leaf, which is built off the highly insulated floor-slab. These blocks are effectively a sandwich of insulation, reinforced with concrete 'legs' which enable them to transfer load from the slab to internal wall leaf, without compromising the thermal performance of the junction detail.
- 3) Ancon 'Teplo BF' carbon-fibre wall-ties are used to knit the inner and outer leaves of masonry together over a 300mm cavity span. These ties have a very low thermal conductivity in comparison with galvanised steel ties, which virtually eliminates cold-bridging.
- 4) Attention to detail – a huge part of meeting the Passivhaus standard is achieved through rigorous reporting of key stages of build, in order to demonstrate that the required standards of workmanship and attention to detail are maintained. The project team recognised early in the process that the supply chain was key in achieving this, and only sought out trades with prior experience of Passivhaus, or a willingness to work with us to learn how to deliver the scheme. We also engaged with Encraft (now Design Buro), a highly experienced consultant with many Passivhaus schemes completed, to act as a consultant to the delivery team, to provide training and advice, and to assist with the compilation and submission of evidence. Through Design Buro, we were also introduced to Mike Neate, from Eco Design & Construction, to work with his team to tape and seal the various junctions and key components, and to also trouble shoot the air-testing process. Mike's expertise has been invaluable in developing the design details, improving understanding of the need for precision and cleanliness while building, and how to sequence the order of build to ensure that air-tight junctions are constructed.

In terms on reporting at key stages our progress, and quality of works on-site, Bouygues UK will use a tablet-based reporting tool called 'Field-View' which can enable site progress photographs to be linked to a set of drawings, ensuring that progress reporting is properly logged plot by plot. This data will in part be used to report site progress and quality, and to provide photographic evidence to the Passivhaus Assessor. Regular site inspections by MWK, Eco Design & Construction and back-up inspections by Design Buro will further reinforce the diligence required to ensure that the Passivhaus standards of workmanship are met.

Bouygues UK is also adopting a policy of preparing a 'pilot-block', which will form a point of concentration for air-tightness – work with the remaining plots will not progress until the pilot block can demonstrate that the required air-tightness, continuation of insulation and quality of workmanship needed to ensure that all plots can meet Passivhaus standard, and be certified as such.