

Case Study

# St Keyna, Keynsham

LOWFIELD
TIMBER FRAMES

# Case Study

Project Name

## St Keyna Primary School

Location

## Keynsham

Project Type

## Education

Specification

## Passivhaus





# The Project

The new Passivhaus extension is a significant step forward in Bath & North East Somerset Council's ambition to create more sustainable school buildings. Designed to minimise energy use and carbon emissions, the extension not only provides modern learning spaces for pupils but also shows how investment in education can support the Council's wider commitment to tackling climate change and creating a greener future for local communities.

Lowfield Timber Frames was appointed under the Contractor's Design Portion to design, manufacture and install a bespoke Larsen-truss timber frame system specifically developed to meet the project's demanding Passivhaus performance requirements. Working closely with H Mealing & Sons, Quattro Design Architects and the wider consultant team, we developed a highly insulated twin-stud wall system that significantly reduced thermal bridging while allowing the wall and roof build-ups to achieve the exceptionally low U-values required.

The wall and roof panels were precision manufactured offsite before being delivered to site without insulation. Once erected, joints were taped and sealed before recycled Warmcel cellulose insulation, manufactured from recycled newspaper, was blown into the completed panels at high density. This approach combined factory precision with installation flexibility, allowing programme efficiencies while maintaining the airtightness standards essential for Passivhaus certification.

This project showcases how collaborative design, specialist timber engineering and modern methods of construction can successfully deliver one of the UK's most demanding building standards while providing long-term environmental, educational and economic benefits.



# Scope of Services

Timber was selected because it offered the optimum solution for achieving the demanding Passivhaus performance targets while delivering programme, sustainability and buildability benefits that alternative structural systems could not match.

Following embodied carbon and structural option studies, the project team selected Lowfield Timber Frames' Larsen-truss system as it combined excellent thermal performance with significantly reduced thermal bridging and lower embodied carbon than steel or concrete alternatives. The twin-stud construction allowed exceptionally thick insulation zones while maintaining structural efficiency and minimising cold bridges at critical junctions.

Our offsite manufacturing process also supported improved quality control, dimensional accuracy and airtightness, all fundamental requirements for Passivhaus certification. The lightweight nature of timber simplified installation on the constrained live school site and enabled faster enclosure of the building.

The ability to manufacture bespoke panels in controlled factory conditions while using recycled cellulose insulation further reinforced the project's sustainability objectives and aligned with Bath & North East Somerset Council's Climate and Ecological Emergency commitments.

*“The lightweight nature of timber simplified installation on the constrained live school site”*

# Outcome

The completed project has been recognised as a landmark scheme for Bath & North East Somerset Council, becoming the authority's first Passivhaus education building and establishing a benchmark for future sustainable school developments.

The completed extension provides 200 additional school places while delivering significantly improved thermal comfort, air quality and acoustic performance for pupils and staff. The Benefits Analysis Report concludes that the building successfully delivers the Council's strategic objectives by combining educational excellence with outstanding environmental performance.

Unlike conventional timber frame systems, the twin-stud Larsen-truss configuration creates a deep insulated cavity while dramatically reducing thermal bridging. This enabled the project to achieve the stringent U-values and airtightness demanded by Passivhaus without relying on more carbon-intensive construction systems.

The successful achievement of demanding Passivhaus standards demonstrates the quality of the finished building and validates the contribution made by the specialist timber frame solution to the project's overall success.

The timber superstructure also supports circular economy principles through the use of renewable structural timber, recycled cellulose insulation and components that can be adapted, reused or recycled at end of life. Compared with alternative structural systems, the solution offered lower embodied carbon, improved buildability, reduced site disruption and outstanding long-term operational performance.

The project demonstrates how advanced timber engineering can provide practical, scalable solutions for future low-energy education buildings.





# Case Study

Client

## Bath & North East Somerset Council

Main Contractor

## H Mealing & Sons

Architect

## Quattro Design Architects

Structural Engineer

## Paramount Structures



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