

Zero Carbon Case Study
Merkinch Primary School

*Pushing towards net zero with a focus
on reducing whole life carbon*

Project: **Merkinch Primary School and Family Centre**

Contract value: **£16.7m**

A lesson in low carbon construction

**Merkinch Primary School and Family Centre -
designed and built to minimise whole life carbon**

Merkinch Primary School and Family Centre is the first primary school in the Scottish Highlands, and the largest in Scotland, to be built using a cross-laminated timber (CLT) frame, a more sustainable model than traditional construction methods.



“ We are committed to supporting the decarbonisation of both our customers and supply chain, and put significant focus on reducing whole life carbon. On this project we were able to reduce whole life carbon by 60% when compared to the original design. ”

Graeme Hannah, Head of Sustainability, Robertson Group

THE BACKGROUND

The original Merkinch Primary School in Inverness was housed in a B-listed Victorian building. After more than 140 years in use, the building's capacity was no longer able to support a growing population, and a new school was commissioned by The Highland Council.

The project was procured via the SCAPE SCOTLAND Construction Framework. Phase One would provide a new school building with 14 new classrooms, an ancillary teaching area, a three-room nursery with nurture rooms, a four-court games hall and an

external, multi-use games area.

Phase Two involves refurbishing the existing building to create a new dining hall and family centre for use by the wider community.



LOW-CARBON REQUIREMENTS BUILT IN

The procurement process specified the use of 'modern methods of construction to create a primary school fit for future generations that sets the benchmark for sustainable education facilities across Scotland'.

The original design - a steel frame with concrete infill panels - was substituted for a CLT frame.

This sustainable, lower environmental impact structure reduced the weight of the foundations, further supporting the reduction of embodied carbon.

It also allowed for better thermal performance, improving the internal

environment and reducing the need for additional energy use in heating and lighting.

The main heating system is powered by a biomass boiler, delivering to both underfloor heating and radiators, and ventilation comes from a blend of mechanical ventilation and natural ventilation through the building design.

“ Merkinch was the first project where we calculated whole life carbon from start to finish, and that’s given us a new process we can apply to other projects. ”

Graeme Hannah, Head of Sustainability, Robertson Group

TARGETING CARBON REDUCTION

Lead contractor Robertson has adopted a ‘whole life carbon’ approach to achieving its 2030 net zero target. That means evaluating embodied carbon, or how many greenhouse gases are released through the entire project, from the materials and processes to the building’s use and eventual demolition.

It’s a long-term view designed to ensure the building achieves low carbon standards not just in the build stage, but throughout its life cycle.

Robertson used ‘one click LCA’ whole-life carbon software to quantify the carbon impact of design and build plans. That also allowed the firm to quantify the carbon impact of key changes and initiatives, and capture whole life carbon for the new school and family centre.

CLT framing from Aberdeenshire specialist Glulam Solutions Ltd created airtight construction to help reduce that final figure, along with the biomass boiler system.

Near completion, a thermal image survey of Phase 1 assessed the thermal performance of the building fabric. Only minor adjustments were required to some external doors, where draught seals were not fully compressing.

The finished building gained an A-rated Energy Performance Certificate and achieved near-Passivhaus energy efficiency standards. Since occupation, the air quality and CO₂ levels have been monitored, with results well within required levels.

The final calculation shows that the Merkinch Primary School project will generate 437 kgCO₂e/m² of embodied carbon over its life cycle – well within the <500 kgCO₂e/m² 2030 target set by the RIBA Sustainable Outcomes Guide.



As one of the largest family-owned construction, infrastructure and support services businesses in the UK, our purpose is to ensure a sustainable future.

Graeme Hannah, Head of Sustainability, Robertson Group



A FOCUS ON NET ZERO

Robertson, one of the first companies in the construction sector to achieve carbon neutral status from One Carbon World, has embedded a focus on achieving net zero into their business. In 2020 the business launched its 2030 Responsible Business Strategy, built around three key principles:

- **People** – enhancing the lives of 10,000 people by creating work placements and job opportunities and supporting apprenticeships, upskilling and new qualifications.
- **Partners** – achieving £1 billion of social value by spending locally and through social enterprises, microbusinesses and SMEs.
- **Planet** – moving beyond carbon neutral to become 'climate positive', generating zero emissions from offices, commercial fleet and construction sites

"We see where our customers are going and we want to help them push ahead with that," says Graeme Hannah, Head of Sustainability at Robertson Group. *"That's a big part of our 2030 journey."*

"We're looking at our own practices – providing electric or hybrid electric company cars at every level, undertaking operational reviews and upgrades for our buildings and making energy efficiency measures a standard part of our site processes, as we did at Merkinch."

"We're also working with partners across various sectors. We sit on the Edinburgh Climate Compact with City of Edinburgh Council and representatives from businesses like RBS, ScottishPower and the University of Edinburgh."

"What we achieved at Merkinch highlights our successful best practice approach to the project as we work towards net zero carbon, as well as providing a modern, healthy school environment for future generations."

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Graeme Hannah, Head of Sustainability, Robertson Group

MERKINCH PRIMARY SCHOOL AT A GLANCE

- CLT frame – **60% less carbon** than steel/concrete construction
- RIBA 2030 embodied carbon target: **<500 kgCO₂e/m²**
Merkinch Primary embodied life cycle carbon: **437 kgCO₂e/m²**
- **Biomass boiler** for underfloor and radiator heating
- **A-rated** Energy Performance Certificate
- **14 new classrooms** and ancillary teaching area;
- **Three room nursery** and nurture rooms;
- **Four-court** games hall



This case study was prepared by Construction Scotland Innovation Centre on behalf of the Scottish Construction Leadership Forum – March 2021.

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