PRESS ENQUIRIES
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CAIRN

PRESS RELEASE

HOUSE MADE BY MANY HANDS

A PIONEERING SUSTAINABLE VICTORIAN HOUSE RENOVATION AND EXTENSION

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Working against the grain and thinking outside the conventional steel and stud wall box, emerging architecture practice Cairn has pioneered use of a new low-carbon concrete in its latest project, a house renovation and extension in Hackney, east London. *House made by many hands* is the first building structure in the UK to specify a low-carbon limestone calcined clay cement (LC3) concrete, a new material which generates 30-40% less CO2 in its production than standard Portland cement. Commissioned by an environmentally conscious client, the compact Victorian house renovation has been a testbed for LC3, a product which has the capacity to reduce total global CO2 emissions by 1-2% if adopted universally by the construction industry. The project demonstrates how a Victorian house can be renovated and extended with a substantially reduced environmental impact – 40% lower than a typical build deploying conventional concrete, steel frame box and plasterboard.

Located on a densely-inhabited, car-free street, the two-storey terraced 77m^2 house occupies a constrained site with no back garden and only a thin strip of external space. As found, it was dark and cramped. The challenge was to work with what was there, designing as sustainably as possible through reuse and repurposing of existing materials to bring it up to modern day standards, creating a homely and productive new kitchen for its owner, a chef with a background in sustainable agriculture.

The highly bespoke project carves light and space into the house. Cairn, working with structural engineers Structure Workshop, has combined LC3 for the floor slab, with a hardwood frame spanning between the brick piers of the Victorian structure. Unlike a conventional domestic extension, steel has only been used sparingly, forming footings and flitch plates at key connections, and allowing demountable bolted connections.

An explicit strategy of reuse underpins the whole project. Adopting a fabric first approach, identifying what was essential, retaining usable original elements, constructing cautiously and interweaving old and new, have been fundamental to the project. Rather than overhaul the servicing of the house, interventions have been simple and low-tech, selectively using what was found (relocating the combination boiler rather than consigning it to a skip), supplemented with energy saving strategies, such as double-glazed windows.

Client and architect were committed to repurposing and, where new materials were necessary, bio-based materials - hempcrete, cork, woodfibre, woodwool, and lime plaster – were specified, to improve health and wellbeing benefits. Lining layers have been omitted where possible, revealing structure and frames so that the new hardwood timber frame forms a key visual component of the ground floor spaces. Where boards were installed, breathable woodwool was used finished with lime render, and the new kitchen worktops by Foresso are made of recycled waste wood products. The result is an airy home with warmth and earthy textures, where old and new blend, celebrating the patina of time.

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The ground floor renovation places the new spacious kitchen at the heart of the house. The floor has been lowered to improve head height and the space benefits from improved connections to the living room and clearer sightlines and access to outside spaces. Upstairs improvements have been made with a renovation of the home office, which now has access to a roof terrace.

Daylight levels have been significantly increased on the ground floor with patent-glazing to the extension roof, a new rooflight above the tiled ground floor bathroom and openings puncturing old and new walls. There are no internal doors on the ground floor, apart from that to the bathroom, to prioritise enjoyment of visual connections and borrowed light. Spaces retain their own character without doors to shut them off, and are instead defined through considered placement of structural piers and changes in floor level.

House made by many hands is the first building structure in the UK to use limestone calcined clay cement (LC3). The technology was developed in Switzerland at EPFL, along with experts in Cuba and India, and has vast potential to reduce the concrete industry's carbon emissions. Concrete made with LC3 looks like conventional concrete and it is mixed and poured in the same way, requiring no additional site training. It has been used here in the floor slab; it was also used to underpin the house's existing brick footings to gain head height in the extension.

The project has been an exercise in balancing the constraints of regulations with repurposing existing infrastructure, with the design being driven by the low carbon content of the materials, their buildability and cost. Cairn worked closely with structural engineers Structure Workshop, using the practice's copyrighted Carbon Calculator to make embodied carbon calculations, informing the choices and quantities of materials.

The client and her partner have also actively participated in the project, working alongside the contractor and architect to cast by hand the hempcrete walls (timber framed with exposed hempcrete infill). The decision to make the walls by hand, replacing power tools with human energy, resulted in a rewarding collective activity and a project made by many hands: the hands of the architects, engineers, contractors and client. This collective endeavour was echoed in the site hoardings which were printed with a montage of sketches on the theme of the House of the Future by pupils of the adjacent primary school: a hoarding made by many hands.

The approach to the base-build of the home is complemented by the furnishing and fittings within. These are re-used and given a second life wherever possible, such as the timber floor which has been reclaimed from Bow Magistrates Court and a collection of second-hand furniture and light fittings. The client was determined not to use new items, unless unavoidable, so that the house is imbued with character and unique histories.

Kieran Hawkins, Director, Cairn, said:
"This project demonstrates how small can be beautiful and less can be enough. It's been a labour of love and an absolute joy to innovate in close collaboration with our consultants led by the unwavering commitment of our client. We see this as a prototype for how a Victorian house might be renovated and extended, with a far lower environmental impact than the ordinary concrete with steel box frames and plasterboard. If just some of these approaches were applied nationally It could significantly improve the carbon footprint of the home renovation sector."

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Dora Taylor, house owner, said:
"Working with Cairn to renovate our home has been an exciting process. From exploring unusual low-carbon materials to experimenting with the layout and uses of different spaces in the house, they have embraced the creativity of making our home lighter, roomier, more functional and more beautiful, whilst remaining true to our values."

Max Clayton, Associate, Structure Workshop, said:
"One of the ambitions of this project was to eliminate steel and concrete as far as possible. The timber performs the same functional role but is more beautiful, characterful, and sustainable. The constraints of the site made it impractical to eliminate concrete in the ground, but these constraints provided an opportunity to replace standard high carbon Portland cement with low carbon limestone and calcined clay. LC3 is an exciting product that is only now becoming available in Europe, and which has the potential to significantly decarbonise the construction industry. There is no reason why innovative concrete mixes of this type could not be used in similar projects across London and beyond, helping to drive down our carbon emissions."

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Notes to editors:

Location:	Victoria Park Village, London, UK
Client:	Dora Taylor and Danny Hubbard
Architect:	Cairn
GIA renovations:	70m^2
Design team:	Kieran Hawkins, Riccardo Bela
Contractor:	David Sheard Ltd
Structural engineer:	Structure Workshop
Kitchen joinery:	Xylo
Photographs:	© James Retief

Cairn is an Edinburgh and London-based architecture studio specialising in low-carbon buildings. Weaving together the pragmatic and poetic, Cairn's projects are driven by the rational and emotional implications of construction; making settings for everyday life that will age well, to benefit a broad range of people over time. A cairn is made by many hands; the name speaks of the practice's commitment to making sustainable architecture as a way of building connections and practical knowledge. The office is leading and collaborating on projects in the UK and Germany, working with ambitious, climate-aware clients seeking environmentally sensitive solutions.

Cairn was founded by Kieran Hawkins in 2018. Kieran trained at UCL, graduating in 2010. He closely combines teaching and professional practice and is currently a Teaching Fellow at the University of Edinburgh and a Director of the AE Foundation.

Projects to date include Sycamore, the transformation of a 1960s house in a Buckinghamshire cul-de-sac (2018-20), and three competition-winning designs for public buildings in Germany. Cairn is currently working on the delivery of Rosshaupten Community Buildings in Bavaria, won in a 2021 international competition and designed in collaboration with London-based EBBA and Berlin-based sophie & hans, working together as EC-SH. The project is anticipated to complete in 2026.
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