

Norton Farm – Bromsgrove, Worcestershire



Principle contractor: Barratt Homes

Client: Barratt Developments / Bromsgrove District Housing Trust (BDHT)

Project: Construction of 164 units with a mixture of one, two and three bed homes in terraced, semi-detached and detached form, of which 98 are to be affordable homes for BDHT

Cost of build: £11,000 per unit (average) for the structural frame

Location: Norton Farm, Birmingham Road, Bromsgrove, Worcestershire

Type of contract: Private and Affordable Housing

Aircrete contractor: SIG* Offsite

Build time: One week per unit

Executive summary:

The SIG* I-House System incorporating Celcon Elements has been specified for use on 164 units on the Norton Farm site in Bromsgrove. The I-House System, a collaboration between SIG* Offsite and H+H UK, provides the speed of offsite construction with the familiarity of a traditional build.

*SIG refers to SIG Roofspace, who have since changed their name to Roofspace Solutions, part of the Saint-Gobain Group.

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Project description:

Norton Farm, located less than a mile from Bromsgrove town centre, south west of Birmingham, is a development shared between Barratt Homes and David Wilson homes, consisting of a total of 316 units. Of the Barratt Homes development, the SIG* I-House System is being used for 164 of those plots. The Norton Farm development is part of Barratt Homes' final trial stages of the SIG* I-House System which has seen several other developments completed across the Midlands.



Each unit is constructed by a three man gang and a crane operator from SIG* Offsite. This has solved one of the critical challenges faced by Barratt Homes in the Midlands, with a shortage of skilled labour creating a delay in construction. A crane lifts each Celcon Element into place where it is secured using a fast-setting mortar specifically created by H+H for use with Elements.

By using the I-House System the external brick façade has been taken off the critical path allowing the ground floor, first floor and roof to be completed, finished and wrapped in insulation prior to bricklayers arriving on site. A bespoke scaffolding system has been created to allow bricklayers enough space to operate while the scaffold remains in place.

The walls achieve a U-Value of $0.27\text{W/m}^2\text{K}$ - similar to that in a traditional build - with roofs achieving $0.8\text{W/m}^2\text{K}$ and floors $0.2\text{W/m}^2\text{K}$

Reason for choosing H+H aircrete products:

The main attraction of the I-House System both on site and for others within the supply chain is that it is very similar to traditional build in its materials and approach so there is no dramatic change to working practices for the follow-on trades. The plumber, electrician and carpenter are all used to working in aircrete buildings.



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Products used / aircrete specification:

Celcon Elements by H+H:
The majority of the interior leaves of the cavity walls are constructed using Celcon Elements by H+H. In some instances, standard grade Celcon blocks by H+H have been used to build specific design details such as bays.

The Celcon Elements are manufactured to the design storey height of a standard house with a width of 600mm and a thickness of 100mm. Where the required width of the modules is less than 600mm or in cases where the Elements are used under windows, the Elements can be cut to size on site. The knock-on effect is of less product waste on site and cleaner work environments. Celcon Elements are lightly reinforced to facilitate the handling and transportation without damaging the product.

H+H element mortar:

A fast-setting and very strong thin-layer mortar developed especially for use with Celcon Elements to form a 2mm airtight joint.

Foundations:

A mixture of trench fill and piled foundations, designed, implemented and validated by the

NHBC prior to occupation of the new homes.

External walls:

Designs for the external walls includes both rendered finishes and brick façades. This will provide a mix of styles to meet the needs and aspirations of the local community and blend with the architectural aesthetic within the existing residential areas.

Roof:

Roofs are either a standard truss roof construction or the 'Roofspace I-Roof', a panellised room-in-the-roof system designed for the UK new build residential housing market.

The I-Roof by SIG* Roofspace is manufactured offsite in a controlled environment making it a faster, cost effective construction. Safety benefits include reduced working at height and the removal of the risk of gable block work collapse.

Floor:

Prefabricated timber I-Floor Joist cassette floors are used in conjunction with the system to maintain the speed of build. Each cassette is lowered into place by crane, sitting on top of the first lift of Celcon Elements.

"It's simply one of the best offsite systems we've seen. It's basically block-work erected in a different way which gives us flexibility on site. If you require any design alterations while on site, you can treat it like a traditional build – if you need an additional window suddenly, you can do it; timber frame can't be altered due to the structural calculations changing."

Steve Cartwright

**Barratt Homes Construction
Director West Midlands**

"The Norton Farm development has been a great opportunity to showcase the speed, quality and performance benefits of the I-House System. We believe that what we have is a package solution for the fast construction of new build homes, something of which the UK housing market is currently in desperate need."

Stephen Knight

H+H Internal Development Manager



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The SIG* I-House System can be used where lightweight or traditional construction would be considered and where the design compressive strength of the masonry is approximately 3N/mm². It is ideally suited for two storey housing and two storeys with room in the roof.

In limited circumstances, where design requirements may not facilitate the full use of Celcon Elements, the H+H Thin-Joint system may be used to complement the Elements in certain sections of the build.

The SIG* I-House System provides a watertight and airtight shell for the follow-on trades to move in to. A house can typically be completed within a week of the scaffolding being erected. It is a very rapid build system that takes the construction of the outer leaf of a cavity wall off the critical path.

Key Benefits of SIG* I-House System:

- Rapid build

- Cost certainty
- Health and Safety improved
- Increased quality control
- Integrated system
- Fully managed package – design, manufacture, install, complete
- Traditional materials and familiar build
- Improved airtightness

H+H – Thin-Joint System:

As well as the Celcon Elements range, the System combines the Celcon Plus and Jumbo Blok ranges of high quality, accurately dimensioned aircrete blocks with specially developed Thin-Joint mortar called Celfix. This provides simple solutions for Parts L and E of the Building Regulations and simplifies the construction process. Thin-Joint block-work enables walls to be built quickly to storey height without having to wait the conventional 24 hours for the mortar to set before further loading can be applied.

The Thin-Joint method of construction enables a fast,

weather-tight masonry shell to be built, allowing follow-on trades to start work sooner in a weatherproof environment, whilst retaining the flexibility of on-site construction. Thin-Joint is a recognised modern method of Construction and has been fully adopted as the preferred method of wall construction throughout most of Northern Europe.

Other benefits include highly adaptable block-work, allowing for any last minute design changes. Components for the Thin-Joint system are all readily available off the shelf, Thin-Joint technology helps achieve a very low airtightness. Fire resistance with a Class O rating for surface spread of flame.

H+H aircrete applications:

- Internal and external leaves in cavity walls
- Solid walls
- Separating / party walls
- Flanking walls
- Partitions
- Infill to multi-storey buildings
- Foundations

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For further information about the subjects covered or the H+H products used in this case study, please visit our website www.hhcelcon.co.uk

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