

# AIMC4

**The AIMC4 project has designed, trialled and used a range of solutions to improve sustainability in a cost effective way thanks to the collaborative work of developers, advisory groups and suppliers.**

The 17 resulting homes demonstrate improvements in energy efficiency, supply chain effectiveness and reduced build costs through offsite construction, innovative material use and solution technologies such as waste-water heat recovery.

## DESIGN FLEXIBILITY

The application and combination of different AIMC4 designs, materials and processes vary depending on the need identified in each of the 17 new homes, highlighting the level of design flexibility at the planning and design stages of the build.

The homes can be adapted to the same extent and with the same ease as most traditional homes.

## CAPITAL COST

The total project cost came to £6.4million, including the planning, designing and building stages. Half of this sum was invested by the Technology Strategy Board and the other half invested by the consortium of members.



The build had an extra-over cost to Code Level 3 of £2.98-£4.57/sqft. The Preston Pans timber-framed builds had volume extra-over costs of £3000-£3700 respectively.

## SPEED AND EFFICIENCY

For each of the Preston Pans timber-framed builds there were less than 750 man hours for each plot; including the substructure, superstructure and internals. This equated to 9-10 hours/m<sup>2</sup> for these two structures.

## PRODUCTIVITY

Productivity varied between the different builds. The average non-value added time for eight timber-framed builds was £2400, with the non-value added time for the two Preston Pans structures averaging 7.4%.

## RISK

The risk was low as the project was a joint venture, which helped to spread the risk between multiple organisations for extended periods designated for workshops, design discussions and assessments.

Extensive planning and thorough design also helped to reduce risk.

## QUALITY AND DEFECTS

Anecdotally the homes are of better quality with less defects. They achieved BOPAS accreditation, which involves 'rigorous auditing and quality assurance to ensure their construction systems are approved for integrity, durability and performance'.

## HEALTH AND SAFETY

The use of innovative smart construction techniques did mean that the team involved had to adapt to different areas of potential risk, such as mechanical lifting and site transport management, but overall created a far safer environment which led to a reduction in risk of injury from manual handling and falling from height. The more advanced offsite system was held in well regard in terms of safety by the health and safety team, site management and operatives.

## WELLBEING DESIGN

The units were designed to perform and meet consumer needs for homes that are low energy, affordable and low maintenance. For each aspect of temperature, layout, ventilation, air quality, daylight, noise all customers were either more satisfied (75%) or neutral (25%) with their AIMC4 than their previous home.

## OPERATIONAL AND EMBODIED CARBON REDUCTION

The embodied emissions of the AIMC4 Stewart Milne property were reduced by 23.53% from 0.34 to 0.26 tCO<sub>2</sub>e/m<sup>2</sup> compared to a similar base case. The emissions for the Crest Nicholson property were reduced by 6.25% from 0.32 to 0.30 tCO<sub>2</sub>e/m<sup>2</sup>.

The embodied emissions of the AIMC4 houses ranges between 25% and 35% of the total life-cycle emissions.

## IN-USE ENERGY PERFORMANCE

The AIMC4 homes are considerably more energy efficient than the national average and a typical household would save £700 per year. In comparison to the estimated costs of gas plus regulated electricity of the UK average home of over £12/m<sup>2</sup>, the AIMC4 homes range between £2.31 to £8.64/m<sup>2</sup>.

## CIRCULAR DESIGN

No provision for deconstruction or recyclability.

### AVERAGE/REGULATIONS

Capital cost	£1850/m <sup>2</sup>
Speed	0.17
Productivity	£25.60/man-hour
PMV	40%
Quality (defects)	99.4%
Health and safety	2.24 injuries per million hours worked
Embodied carbon	875 Kg/m <sup>2</sup>
In-use energy	EPC Rating B

### AIM4C

	Stewart Milne	Crest Nicholson
Capital cost	N/A	N/A
Speed	9.29 man hrs/m <sup>2</sup>	N/A
Productivity	8.6hrs/m <sup>2</sup>	N/A
PMV	N/A	N/A
Quality (defects)	N/A	N/A
Health and safety	N/A	N/A
Embodied carbon	260 Kg/m <sup>2</sup>	300 Kg/m <sup>2</sup>
In-use energy	EPC Rating B	EPC Rating B

The data is separated in a different table as some of the measures were collected using different methods, therefore not strictly comparable like-for-like.

# CONTRIBUTORS



## CASE STUDY CONTRIBUTORS

Email: [sdalgarno@stewartmilne.com](mailto:sdalgarno@stewartmilne.com);  
[darren.dancey@crestnicholson.com](mailto:darren.dancey@crestnicholson.com);  
[oliver.novakovic@barrattplc.co.uk](mailto:oliver.novakovic@barrattplc.co.uk)

Web: [www.aimc4.com](http://www.aimc4.com)



## PICTURE CONTRIBUTORS

Stuart Milne Group  
Barratt Developments  
Crest Nicholson PLC  
H+H UK Ltd

# THE CONSTRUCTION LEADERSHIP COUNCIL

The Construction Leadership Council (CLC) works with industry and government with the objective to identify and deliver actions supporting UK construction in building greater efficiency, skills and growth. It draws together business leaders from across the sector to identify how to promote solutions to meet the ambitious government Construction 2025 targets. This is being delivered via a number of workstreams.

The Construction Leadership Council's Innovation in buildings workstream is embedding innovative construction techniques to improve productivity and capacity in the construction industry, and the quality and whole-life performance of buildings. The work stream is initially focussing on homes, taking action to overcome some of the key barriers to the take up and the commercialisation of Smart Construction; it will expand to all building types later.

To find out more about the Construction Leadership Council, please visit the website: [www.constructionleadershipcouncil.co.uk](http://www.constructionleadershipcouncil.co.uk)

