

'WHY IS THE TIME NOW RIGHT FOR OFFSITE' in an increasingly challenging housing market?

CASE STUDY



ABSTRACT

Despite evidence of success in other countries with similar challenges and characteristics to the UK, the last 10 years has seen only a moderate increase in factory-built homes.

One reason for this is scepticism about whether they provide good value for money.

So, is there a business case for factory-built homes from the perspective of a landlord owning and maintaining homes in the UK? A business case that would provide proof these homes offer:

- > Lower whole life cycle costs benefit for customers and the landlord, with lower build as well as ownership and management costs.
- > Improvements in standards and build quality, compared to traditional methods of construction.
- > An alternative solution to existing shortages in skilled labour and house builders in some areas.
- > Reduced build times, with efficiencies in processes, adopting modern digital technologies, as well as a viable, scalable and sustainable production lines.
- > Improved levels of environmental sustainability in regard to lowering energy use, waste and CO2 and better use of sustainable materials.
- > Socially sustainable housing and neighbourhoods not just 'thrown up' to meet immediate needs.

Magna Housing and South West Procurement Alliance (a provider of public sector frameworks) commissioned Complex Asset Management Solutions (CAMS), an independent consultancy to answer the above question. The case study below indicates that:

- > houses built using Modern Methods of Construction (MMC) are affordable and can deliver better value when assessed on a whole life cycle costs basis.
- > the benefits of MMC can only be obtained if commitment is made to upfront design standardisation and scalable production, delivered by an integrated supply chain including Homes England, local planning authorities, housing associations and vendors.

If the commitment is made to MMC, we expect to see higher levels of production leading to greater competition, more innovation in materials and production methods, and lower costs.

The case study describes the challenges and the approach to assessing the business case for MMC, and the steps taken since to implement the findings by embarking on a systematic approach to developing a long term asset management and development (creation) plan.

THE CHALLENGE

Whilst the government has a presumption in favour of MMC and there have been exemplar pilot projects over the years, the default position for new housing delivery is mainly traditional construction.

Where modular build has been delivered as a pilot or bespoke project, there has typically been upfront time and cost spent on design and production set up, making modular production on this scale uneconomic. Hence, efficiencies through scalability, supply chain deals and wide-ranging stakeholder support may not always be realised. Current cost comparisons show that building offsite built homes are 25 to 30% more expensive than traditional methods*.

The challenge of this project is to determine whether there is a business case that helps deliver on both short term (comparable build costs) as well as the longer term over the life of the homes.

**It should be noted that the average price differential between modular and traditional houses comparing framework prices at the time of original tender was 19%. Source: SWPA*

THE APPROACH

Understanding the appetite for adopting alternative methods of construction...

The way a landlord manages homes is determined by a blend of three competing pressures:

- > **Costs:** Cost driven organisations focus on cheapest solutions in the short-term, they rarely consider longer term whole lifecycle cost solutions. Short term, low initial capital investment can later lead to expensive downstream expenses.
- > **Quality:** a performance focused organisation may want to be known for exemplar quality and services. In the extreme, this can lead to rising and unsustainable costs and become uneconomical.
- > **Risk:** a risk averse organisation tends to focus mainly on compliance and are typified by a lack of innovation, preferring a strategy of simply following traditional ways of working, and not adopting new or emerging alternative practices until well proven.

In practice, a solution that blends the above is defined by the Board and leadership team. It is essential that these dynamics are understood when considering the business viability for alternative build technologies.

For Magna Housing, the strategic objectives have been guided by five pillars:

- 1 - Provide **high quality** housing and services.
- 2 - Have good **leadership** and governance.
- 3 - Achieve **value for money** in the **use of our resources**.
- 4 - Develop, motivate and reward staff to achieve, **innovate** and take responsibility.
- 5 - Achieve the best **mix of risk**, prudence, flexibility and **cost-effectiveness** in our finances.

The above strategic objectives should influence the selection of house build technology.

The translation of the above for new homes at Magna Housing is conveyed by the Board policy statement, "We forecast more offsite construction of components or whole homes than in the past. This should improve quality control. We will consider using Modern Methods of Construction (MMC) and offsite construction of components or whole homes for all developments."

This statement of intent presented an opportunity to assess Magna Housing's current strategy for delivering and managing new homes.

Step 1: Reviewing and updating Magna's Strategic Asset Management Plan.

Magna Housing started the process of updating its 2016-21 Strategy including a new 5-year Strategic Asset Management Plan in 2018.

This included a review of the asset management strategies of other industries to assess whether practices in asset life cycle management could add value and be transferrable.

The first change from Magna Housing's traditional approach to managing assets was the assessment of the approaches within the ISO 55001 Standard for Asset Management. In considering the adoption of ISO 55001 principles, CAMS was asked to extend the case study and work with Magna Housing to benchmark them against the ISO 55001 Standard.

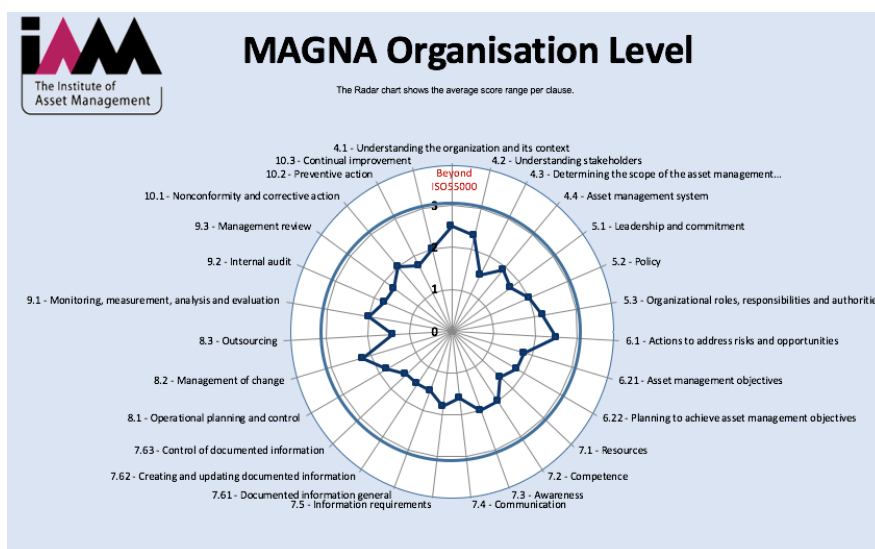


Figure 1: Asset Management Maturity

Figure 1 shows the result of a gap assessment of current strengths and weaknesses when measuring maturity against the requirements of ISO 55001.

The results led to the development of a Magna Housing Asset Management Framework, which draws a tangible line between the phases of a house life, from planning, design, construction, maintenance, and end-of-life, and across all functions involved in the management of assets. This helps to understand and manage the links between actions in one area and their impact elsewhere, e.g. cheaper build increasing downstream maintenance. This is fundamental in establishing the principles for Whole Life Cycle management and the first step to the business case assessment for MMC.

Two areas of the Magna Housing Asset Management Framework (Figure 2) are most relevant for this case study:

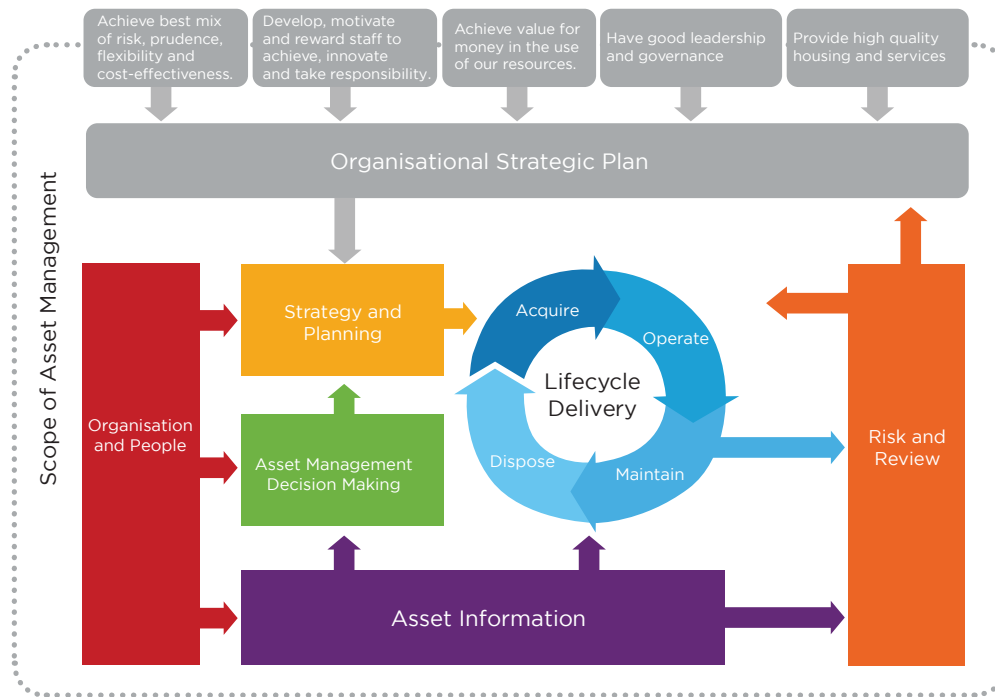


Figure 2: Draft Magna Asset Management Framework

1. Strategy and Planning: The development of the Strategic Asset Management Plan (SAMP) sets out how the organisation's objective is set and will be met and provide an insight as to the potential value of MMC and offsite for new housing developments.

According to Paul Read, Head of Development & Sales at Magna Housing, "Developing the SAMP has enabled us to rethink our approach from traditional development to Asset Creation. and start to adopt an improved approach to stewardship that embraces a more integrated whole life ethos, while focused on strategies to reduce build costs."

Supported by Yogesh Vadgama, the Head of Asset Management, "the SAMP will act as an enabler towards greater integration between asset creation, maintenance and operations. It is giving us a greater sense of aligned objectives, leading eventually to greater efficiencies and economies in housing solutions."

2. Decision Making: Four of the 31 improvement initiatives in the SAMP identify a need for a business case tool to assess whole life cycle costs to support better decision making and compare the real value of different housing options. Such a tool must consider:

- > The whole life cycle costs, spanning planning, acquisition, development, operations, maintenance and end of life
- > The cash flows and associated timings including the impact on grant requirements of different options.
- > If one method is more expensive initially, does it pay-back when considering cost of ownership post construction and if so, what is the break-even time?
- > The difference in the total cost of section-106 houses provided by a developer, and homes delivered directly by Magna Housing?
- > Which housing cost components are the most expensive and should be addressed through better design?
- > What is the best strategy for sites that are dormant or at their end of life?
- > What is the impact of data uncertainty, and the required confidence levels for data and information sets?

Step 2: Creating a decision support tool to analyse alternative housing solutions.

To carry out whole life cycle analysis, a Decision Support Tool (DST) was developed by CAMS (Figure 3) in collaboration with SWPA and Magna Housing.

Data is input for each phase of the house life cycle; the tool then provides a range of results in tabular and visual format that answers key questions and enables informed decisions to be taken in selecting the best build approach.

The bullet points below set out the assumptions used in this case study to populate the DST and compare costs for a standard 3-bedroom Magna Housing home using different build technologies.

Figure 3: DST model set up screenshot

At this time, assumptions were based on a mixture of real cost data and experimental assumptions:

- > All build types assume the same levels of income (sales and rentals).
- > Offsite MMC homes are built in 30-60% of the time it takes to build the equivalent traditional homes (generating revenues from grants, sales and rentals quicker).
- > Offsite MMC homes are 15-25% more expensive to build, based on a sample of 52 homes across seven sites.
- > 5% contribution costs for designing the offsite solution were applied, assuming that design costs per unit decreases as more homes are built.
- > Lower maintenance costs for offsite than traditional build, by between 10-30% based on researched data available in the public domain*.
- > Residual value at end-of life is same for all options, equivalent to land value.
- > All analysis is carried out using NPV costs, with a 5% discount factor applied.
- > Data provided by SWPA who have access to cost data on the differences between traditional and offsite construction gained through tendering exercises carried out across the UK.

*Examples include: HM Government Industrial Strategy, National Audit Office, KPMG reports, (Goodier n.d.) Loughborough University in 2005, BURA

Figure 4 provides the total cost comparisons over 30 years.

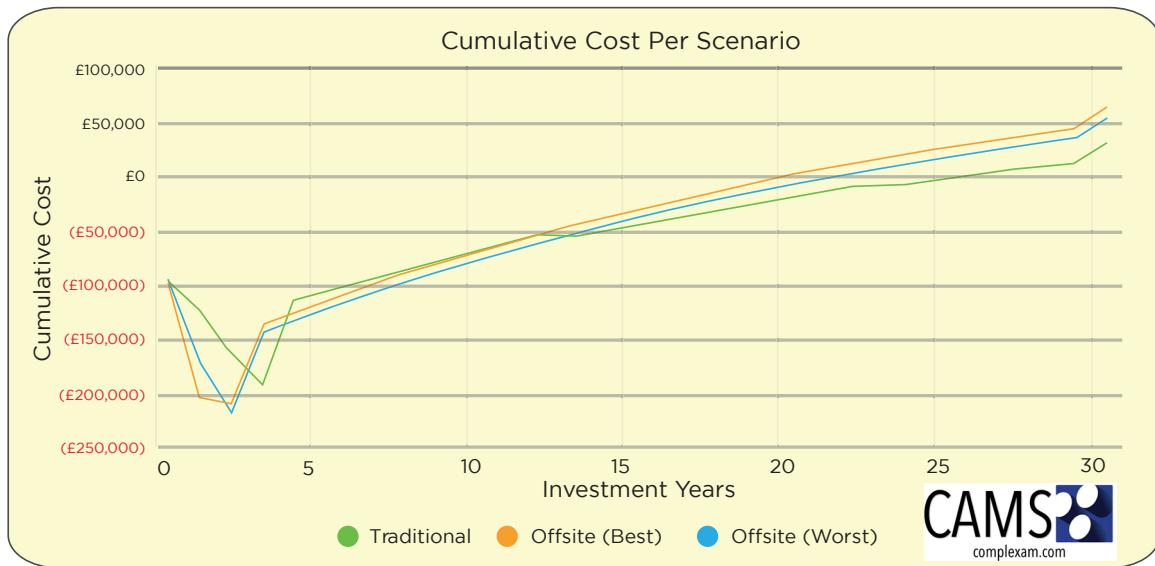


Figure 4: WLC Cost comparison between traditional and offsite home

Figure 4 shows that over a 30-year planning period, the offsite solution is best value, even when analysed in terms of the worst-case scenario e.g. Highest build costs, longest build time, highest maintenance costs. Despite higher initial design and build costs than traditional build, total costs are lower due to less maintenance required for MMC offsite homes (due to high specification and build quality).

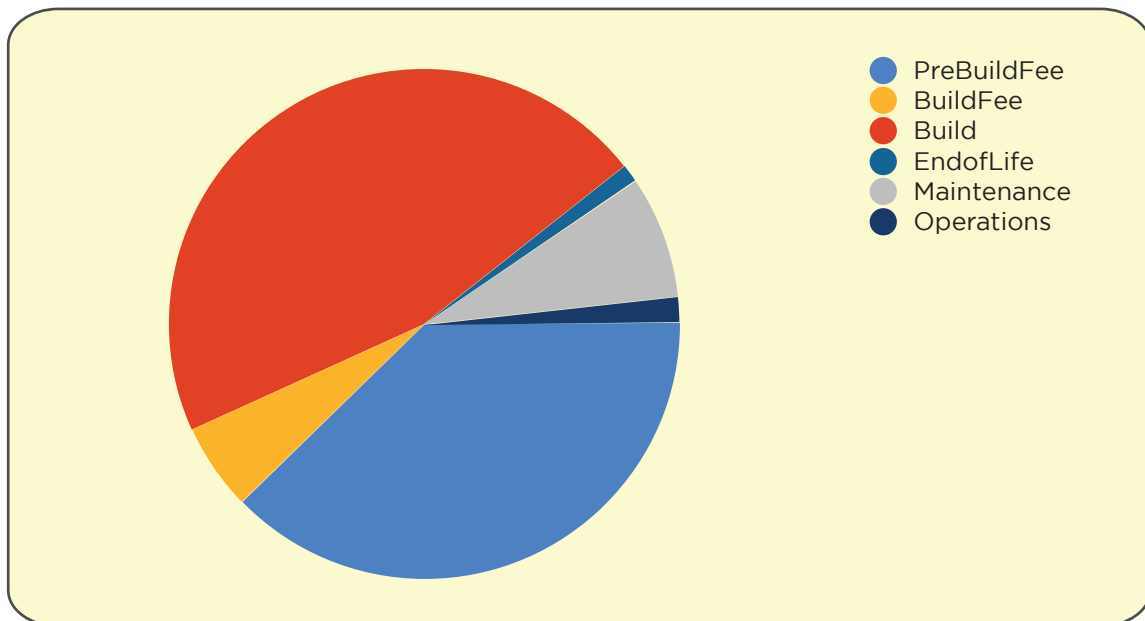


Figure 5: Split of WLC costs across asset stages for Offsite

Figure 5 shows total costs split according to the individual life cycle phases of the offsite home. This shows that the greatest opportunity to reduce lifecycle costs for MMC offsite homes remain in the pre-build and build phases, areas where there are opportunities for improvement from scalability and innovation.

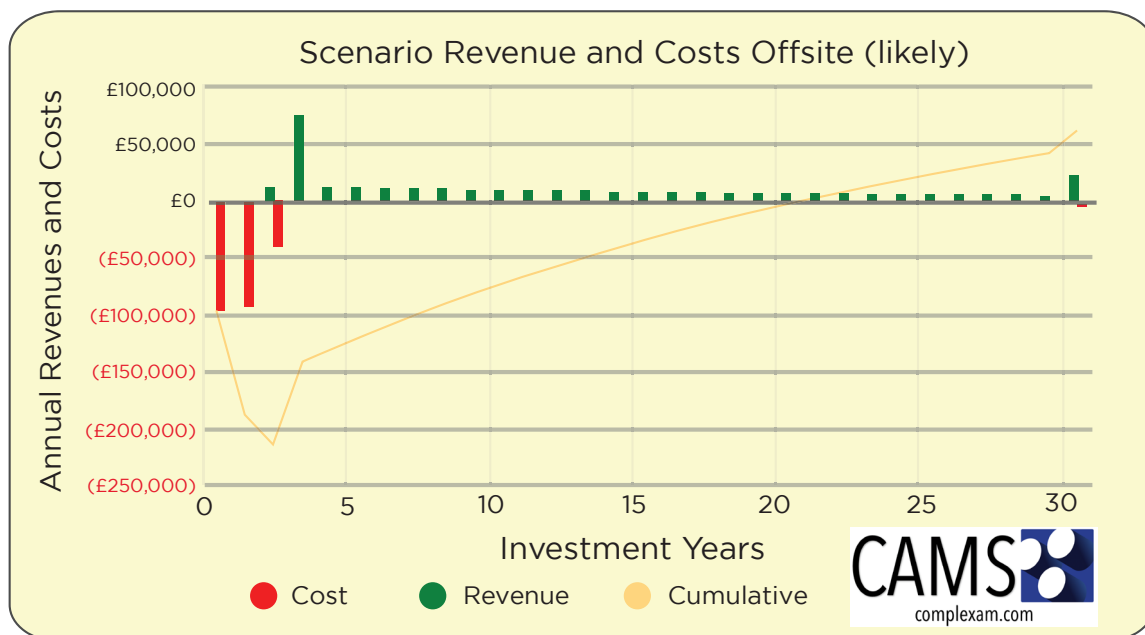


Figure 6: Discounted annual cashflows for Offsite home over 30 years

Figure 6 shows the discounted annual cashflows for the MMC offsite solution for the most likely case, with the breakeven point for the investment shown at around 20 years.

Step 3: Finding the best delivery partner through an innovative collaborative tender.

The above analysis has demonstrated that there is a potential business case for MMC offsite homes when considering whole life costs. But with higher design and production costs than traditional build, the next stage involved exploring these further.

SWPA has been at the forefront of promoting MMC, working with clients and providers to develop solutions that are in line with the Government's Construction Sector Deal and has a framework available for modular construction. This enables clients to streamline the procurement process by gaining assurance that the providers are suitably qualified and have the necessary experience to carry out the specific requirements. Formal procurement can be reduced to four weeks if a mini competition is used or less if a direct award is carried out.

The SWPA has an existing framework covering offsite construction of new homes, New Homes 1 and has just completed the procurement of a new framework for Offsite Construction New Homes 2 that runs until May 2023.

Magna Housing had initial discussions with SWPA Framework providers in advance of a mini tender under the SWPA NH1 framework to ensure that the providers were aware of and agreed with their long term aims and aspirations. A mini tender was then carried out where the key selection criterion was on ability and willingness to collaborate (pricing had already been assessed at appointment to the framework) and Rollalong Limited was selected as the preferred provider.

Step 4: Appointment of modular manufacturer (Rollalong Ltd) as part of the team.

A joint partnership relationship was established from the outset between the Magna Housing and Rollalong teams to ensure that any issues are quickly resolved in a collaborative way. Preproduction design for standard Magna Housing types was a necessary part of the process to make the house types 'factory ready'. It included adapting and standardising Magna layouts, components and materials to make them suitable for offsite production ensuring quality, environmental and acoustic standards are achieved. Other activities included building in the capability to expand or contract the housing build programme at short notice by pre building modules and storing them at the Rollalong factory until required to meet a housing development programme. This was a solution already tried and tested by Rollalong with the MOD.

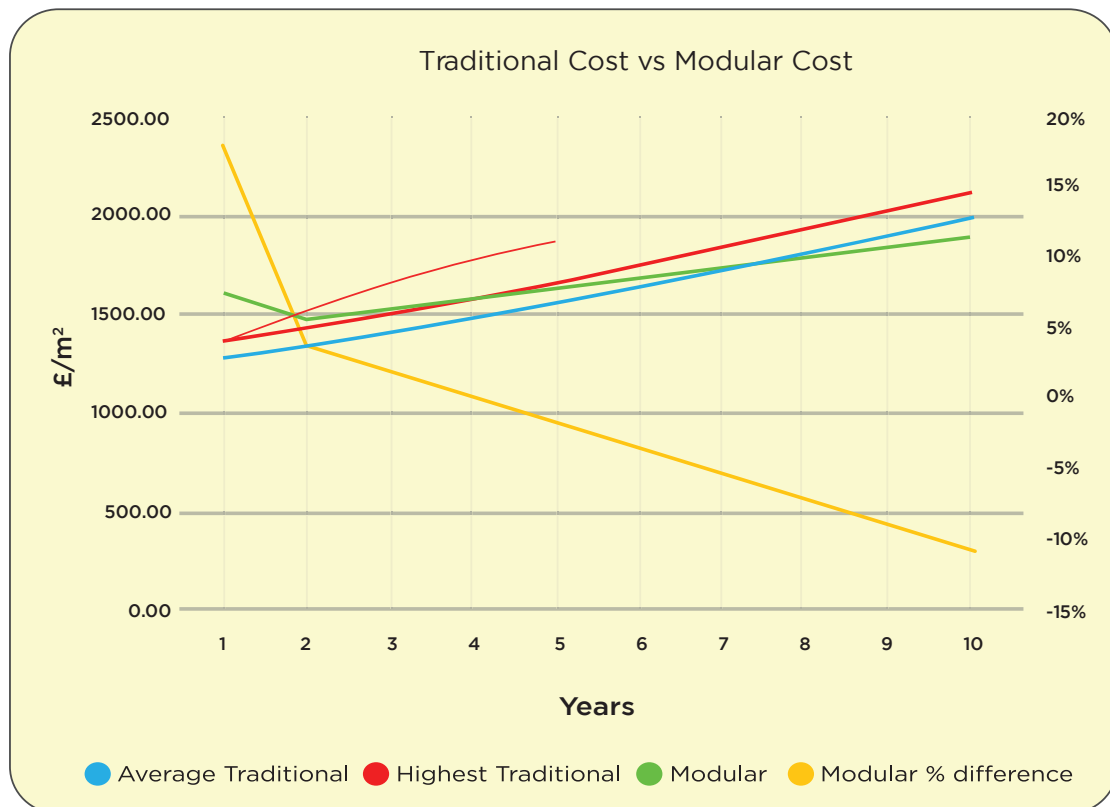


Figure 7: Projections for future cost reduction in offsite building

To reduce design and build costs, Rollalong is committed to working with SWPA and Magna to find savings that will enable the unit cost for offsite homes to decrease over the next 10-years. This is illustrated by the projections shown in Figure 7.

CONCLUSION

The following sets out this case study's conclusions on Magna Housing's process in developing improved housing solutions:

- > Following the Asset Management framework of ISO 55001 has enabled Magna Housing to take a big step towards a more integrated approach to managing homes.
- > The Decision Support Tool (DST) will now be refined, and more data added to enable smarter analysis and more informed decisions to be taken as to whether MMC offers the best approach in a site-specific scenario.
- > Data to populate the DST models derived from the Magna Housing information systems, and costs for alternative MMC from suppliers on the SWPA procurement frameworks, demonstrates a sufficient robustness in the results and observations to invest in this initiative, and will be further refined over the coming year by CAMS.
- > Using the DST to analyse different MMC technologies demonstrates that there is a strong business base for offsite construction when considering whole life costs.
- > Data uncertainty on future maintenance costs for offsite homes does not materially impact the results.
- > The adoption of a smarter incentivised and collaborative procurement framework through SWPA is proving successful in aligning goals, encouraging innovation that in turn is already seeing a downward trend in production costs for offsite houses.
- > The continued input from the supply chain, and in this case Rollalong continues to identify opportunities to reduce costs for offsite, further cementing this technology as being an attractive housing solution in both the short and longer term.

THE FUTURE

Magna Housing is adopting a new asset management framework and implementing the initiatives contained in the SAMP. As a result, the principle of considering 'modular first' will be used with all parties focused on ensuring that an affordable and continuous supply of MMC homes can be delivered to meet Magna Housing's development requirements. It is recognised that not all sites will be suitable for offsite modular solutions due to logistical and site constraints, this will be assessed using the DST on a case by case basis.

The team is now focused on delivering:

- > A completed house ready for public view in late summer 2019.
- > A full production programme starting in summer 2019.
- > A pattern book of designs worked up in partnership with the Local Planning Authority, for offsite production that can be pre-approved reducing the planning period to days. This document also plans in the product development to decarbonise our new build homes in advance of government targets.

In the background working to:

- > Collaborate with planning authorities to develop standardised approved designs for offsite homes whilst allowing flexibility for local conditions so that planning can be approved before production commences.
- > Encourage other affordable housing developers to join in and so benefit from the design and production work already carried out, increasing scalability and lowering production costs.
- > Promote to other housing providers the benefits that can be gained financially and in terms of resilience by adopting a structured whole life approach to housing asset management.
- > Develop the existing DST to link to Magna Housing IT Systems, and support lifecycle assessment at asset level for operations, maintenance and design improvement.

ABOUT OUR TEAM



South West Procurement Alliance, a leader in housing procurement providing expertise in procurement and organisational integration in the offsite industry and with direct links into framework suppliers to drive efficiency and productivity through the supply chain. SWPA provided leadership for the scoping of this project as well as sponsorship and funding.



Magna Housing an 'informed client' wanting to develop 600 homes throughout Dorset and Somerset over the next 3 years, whose board has signed up to an MMC first approach but wants proof that this delivers on value for money and quality.



CAMS, an expert in asset management consultancy bringing experience of over 20 years from other sectors to develop the processes and analysis to demonstrate a whole life cycle approach to managing housing assets. CAMS worked with the team to create the Magna Housing SAMP as well as the DST for use on this project.



Rollalong Ltd an experienced provider of robust high-quality modular buildings. Rollalong has collaborated with CAMS to develop the WLC cost models and develop technical solutions with Magna that will lower build costs as production is scaled up.



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