



Briefing 18/36 October 2018

# Modular Housing – it’s historical role and current use in Local Government

## Key Issues

The mismatch of housing supply and demand is a problem this country continues to face. Be it in the public sector, private rented sector or on the open market, builders and providers are being encouraged to think more innovatively about how and where homes are constructed to try and meet the demand. The Government’s recent Housing White Paper encourages the growth of the housing sector and advocates builders increase their use of off-site factory built modular homes. This Briefing provides a general overview of Modular housing in England, it’s origins and uses and provides a few case studies to show how and where it has already been adopted.

## 1. What Is Modular Housing?

Modular housing, or off-site manufactured accommodation can range from shipping containers to high- specification dwellings such as the Ladywell scheme in Lewisham, further details for which are provided in this briefing. It can be delivered on site from a lorry, constructed rapidly, then moved to another site when the original site is required for more permanent accommodation.

Off-site construction allows most construction phases to be undertaken simultaneously. While site preparation, foundations and utility connections are being prepared, whole completed housing units can be built in a factory ready for final assembly and finishing in situ.

## 2. Historical Role of Modular Housing

### 19<sup>th</sup> Century

The first on-record example of pre-fabricated/modular housing dates back to 1837, when a London-based carpenter called Henry Manning designed and constructed a type of house he could transport and assemble for his son, who was emigrating to Australia. The unique and innovative appearance of the property caught on, and by 1853 Manning was shipping hundreds of modular builds to Australia each year.

## **20<sup>th</sup> Century**

The Burt Committee (Interdepartmental Committee on Housing Construction) was a working party established in September 1942 by the wartime coalition government, with a remit to consider which methods and materials would be most cost-effective for providing homes after the Blitz war damage and the unfinished work of slum clearance had left many people homeless and living in unsanitary conditions.

Winston Churchill declared that the Government would produce 500,000 prefabs and allocated £150m to the programme. The houses were cheap and easy to make – particularly in the factories that had previously produced components to support the wartime effort for aircraft production. Consequently 156,623 prefabs were designed, produced and erected between 1946 and 1949, with some built on parks and open spaces and others on bombsites, simultaneously helping to restore the economy in the UK and quell the housing crisis.

They were deemed to have a 10-15 year lifespan, after which they would be demolished and replaced with permanent housing. Most have since been demolished, however it is estimated there remain between 1,000 and 2,000 original prefab homes still being lived in. Having been refurbished and re-clad, they are probably indistinguishable from traditional bungalows.<sup>1</sup>

Despite the post-war efforts, there remained a housing shortage which traditional construction methods could not satisfy. Hence more industrial methods were used and over 425,000 homes were built in 1968 alone, much of this was substantially manufactured offsite(3)<sup>2</sup>.

## **21<sup>st</sup> Century**

Once more, as in the 20<sup>th</sup> Century, we see that housing need and the shortage of supply, is back up high on the political agenda.

A briefing in the Local Government Chronicle in April 2018 reported on a decision of the Greater London Authority's Assistant Director of Housing to "commission a consultancy into the developing of a common framework for delivering precision manufactured homes at scale in London". Further, it reported that "greater standardisation could reduce the costs associated with precision manufactured homes by reducing the need for full designs from scratch for each development and bring down costs of manufacture as components for a range of suppliers can be manufactured in a single factory".

In the London Plan, the Mayor set out targets to build around 65,000 new homes a year in London over the next decade to address the capital's housing shortage and acknowledged that traditional construction methods alone would not be enough to increase output to the necessary extent.

### **Use as temporary accommodation**

In their 2017 report entitled "Council Innovation and Learning in Housing Our Homeless Households", the Local Government Association made many recommendations for how Local Authorities could reduce their use of costly and highly unsuitable B&B accommodation,

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<sup>1</sup> The Prefab Museum – A Short History of Pre-Fabs

<sup>2</sup> London Assembly Planning Committee Report, 2017

including through “investigating innovative construction techniques such as re-deployable modular housing.”<sup>3</sup>



Modular housing offers a particularly attractive solution as temporary accommodation by virtue of the speed of construction, the reduced disruption to local residents/neighbours during the development of sites, and the very fact that it can be fabricated off-site, delivered onsite from a lorry and constructed rapidly.

A further advantage of using Off Site Manufacturing (OSM) as temporary accommodation is that homeless households can remain in their borough of origin close to local services, friends and family, children can stay in the same schools thus avoiding the additional stress and disruption caused by being uprooted, and families can stay with their existing doctors/dentists.

Compared to private sector leasing as an option for temporary accommodation, OSM allows families to stay together (as opposed to being split into different rooms if in B&B rooms only), and retain the ability to cook for themselves (again, not possible in a B&B).

The increase in homelessness has put pressure on local authority temporary accommodation budgets – particularly in the capital.

Further, providing self-contained accommodation (such as via OSM) contributes to reducing the reliance on the private sector through out of area placements, a particular problem in Inner London due to the lack of accommodation.

### **To rent or sell on the open market**

Modular housing may also help address the need for more homes via the rented sector or add to what is available on the open market to buy.

For example, Urban Splash is a British based regeneration company, and are proponents of factory-built homes. Production line precision makes their product extraordinarily airtight, thus improving their energy efficiency, and are highly customisable. Their 43-home scheme called hOUse offered a starting price for the homes in New Islington, Manchester of £200,000, all have now been sold and are occupied.

For those investing in their future home, the flexibility provided by this construction type has allowed owners to choose the internal layout, colour palette and the size of their new homes (ranging from 93 to 140 sqm). With external cladding that can be adapted to suit local planning requirements, the homes were completed in 20 weeks (16 weeks for construction, 4 weeks to finish the interiors).

### **Off-site manufacture for construction: Building for change**

On the 19 July 2018 the House of Lords Science and Technology Select Committee published a report following an inquiry that considered whether manufacturing buildings and

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<sup>3</sup> Housing White Paper 2017 – DCLG - “Fixing Our Broken Housing Market”

infrastructure (or components of them) off-site could improve productivity in the construction sector.

In the conclusions drawn from the inquiry the report states that there are clear and tangible benefits from off-site manufacture which make a compelling case for its widespread use. The report sets out a range of recommendations and provides clear endorsement of the Government's presumption in favour of off-site manufacture and the commitment made to invest in off-site in the 'Construction Sector Deal.' The full report can be viewed via the following link: [Off-site manufacture for construction: Building for change](#)

### **Housing White Paper 2017 and Modular Housing**

In 2016 the Government commissioned a review of the construction labour market model by Mark Farmer, Founding Director and CEO of CAST. His research, entitled "Modernise or Die", findings and recommendations fed into the Government's Housing White Paper, which sets out how they intend to stimulate the growth of the housing sector through a variety of policy and funding programmes including a greater use of off-site, factory built modular homes.

Under the heading of 'Accelerated Construction', point 3.10 of the Government paper states "The Government is taking direct action through the Accelerated Construction Programme. We will help diversify the house-building sector and see homes built quickly by partnering with small and medium-sized builders, contractors and others to build out surplus public-sector land'.

Point 3.11 moves onto say that the Government wants to "see up to 15,000 housing start-ups over the parliament, through building out public sector sites faster than traditional disposal rates". Further, the Government will "catalyse changes in the wider housing market through supporting offsite manufacturing techniques and increasing the number of participants in house-building; and generate higher receipts for the taxpayer through sharing risk and reward in the development of our land."

This echoes what was said in the report produced after the London Assembly met in August 2017, with the London Mayor seeking to encourage the Build to Rent sector as a form of development as another way to boost the delivery of new homes in London. It is more affordable than market sale, with lower barriers to entry, with required deposits more in the region of £1,000 to £2,000, as opposed to the average house purchase deposit of £80,000 for first time buyers.

### **3. Why the move to Off Site Construction Types/ Modular Housing?**

- Off site manufactured (OSM) accommodation provides a way to make timely and cost effective use of land such as brownfield sites, small sites, or in-fill sites such as those previously used for garage blocks which may not otherwise be developed on, or might sit vacant for years awaiting permanent development.
- OSM homes outperform energy use of traditional homes, reducing utility bills by up to 25% up to 80% on gas bills and 30% on water.

- It is suitable for all tenures and is particularly suited to the rental sector (either short or long term), due to the delivery of a fast rental stream it enables.
- They can be adapted to suite any potential development site, at a range of densities that can be adapted to suit a range of local priorities.
- With OSM being lighter, it requires considerably less obtrusive foundation preparation, and uses less concrete and steel in its construction.
- OSM has the potential to be installed over existing buildings or even added on top of blocks of flats. One idea, launched in 2016 would enable modular homes to be built on stilts above car parks. The homes would be designed to almost 'Passivhaus' status, with a highly insulated timber frame pod. The properties would sit under a solar-panelled roof, which would provide 90% of the homes' energy (4)<sup>4</sup>.
- A fundamental advantage of OSM is that the units are relocatable and reusable on future sites. With the units having a life of between 40 and 60 years, there is great potential for long term savings.
- Using pockets of land to build modular homes utilises vacant land that might have been at risk of anti-social behaviour activities, reduces potential negative environmental impacts and fits with local authorities' civic pride objectives, e.g. 'Encouraging Civic Pride' and 'Growing the Borough' as in Barking & Dagenham.
- Unless construction components are sourced domestically, imported parts add air miles, thereby cancelling out any positives gained through energy efficiency.
- Off-site construction could be key to allowing a construction industry facing a skills shortage to grow. Off-site specialists have a permanent and highly-skilled workforce and a robust, long established supply chain, thus reducing the reliance on sub-contracted labour.
- Construction in a controlled factory environment provides the advantage of being more reliable, predictable and safe.
- The list of off-site construction companies is growing, with Legal & General (insurance giant) setting up L&G Homes in a factory in Leeds where they intend to build up to 4,000 homes a year, produced as much as possible from domestic materials. Further, the build-to-rent developer Essential Living is looking to off-site construction as a means to start making money earlier once its Creekside Wharf scheme in Greenwich London is completed.
- In his report "Modernise Or Die", Mark Farmer predicted that over the next ten years there will be an estimated 25% decline in the labour force. Combined with the fact that a large part of the construction workforce are from other European countries and the problems of housing shortages and skills shortages may only be exacerbated after Brexit due to a loss of semi-skilled building labour. These factors make the move to modular house construction all the more attractive as it offers settled employment in areas geographically that may have a glut of skilled labour with very little property construction taking place, for skilled workers, and is no longer weather dependant and seasonality as much of the labour takes

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<sup>4</sup> <http://www.building.co.uk/homes-above-car-parks-plan-launched-at-ecobuild/5080534.article>

place either in a factory or actually within the units themselves – either off site or once they are in place on site.

## **Case Studies**

### **Reading Borough Council**

Reading Borough Council set out and delivered on an ambitious project to address the increase in demand for its temporary accommodation by investing in modular homes. A site was found on Lowfield Road (a former mobile home site) to build 28 units for use as temporary accommodation for families who would otherwise be staying in bed & breakfast accommodation. Its brief was to produce accommodation that would be robust, aesthetically pleasing and sympathetic to its surroundings, cost effective to manufacture and maintain, with a standard approach to manufacture, and to be relatively straight forward to remove and relocate, given that the units would only have temporary planning permission.

Key details for the project are provided below.



- Total build time taken from tender to completion was 12 months (included an 11 week delay by the suppliers);
- The dwellings were awarded a SPA band rating of 81;
- To prevent the dwellings resembling shipping containers, the outside was clad in Thermowood with a fire retardant;
- Reading Borough Council estimate the energy cost to run each unit will be approx. £307.35/year;
- The 28 two-bedroom units measuring 56m<sup>2</sup> each cost £2.2 million to build, which equated to £52,000 per unit excluding landscaping, £80,000 per unit with landscaping, as compared to a build cost of £170,000 for a permanent two-bedroom property;
- A children's play area, bike sheds and landscaping were incorporated into the overall design for the scheme to create more of a 'locality' feel to the area, rather than it resembling a heartless infill site.
- Inside the units provide two bedrooms, a bathroom, fitted kitchen-diner and living room, UPVC window and doors.

## London Borough of Lewisham

As previously mentioned, OSM housing can be constructed and readily habitable in a much shorter time frame than traditionally constructed houses, which means rent begins to flow much quicker. The London Borough of Lewisham's PLACE Ladywell Scheme is a good example of where this has worked. Construction on the former site of a leisure centre commenced in November 2015, and the majority of residents had moved in by August 2016. The six-story scheme provides 24 two-bedroom homes, and 880sqm of business and community space. Each unit cost £156,000 to construct, which includes fitting all homes with kitchens, white goods and bathrooms.



At a cost of £4.3 million, the scheme will pay for itself in seven to ten years as a result of the speedy construction time, delivery of rents and reduction in the cost of temporary accommodation payments via B&B and the Private Rented Sector use. Lewisham Council are expecting to save £140,000 a year by not paying to house homeless families in low-quality temporary accommodation. This aspect of OSM is particularly relevant to London, given that it's Authorities spent approx. £650 million on temporary accommodation costs last year.

The site selected is to be utilised for a period of four years, with the buildings designed for removal to another site in the borough at the end of that period;

The homes have been constructed to exceed minimum space standards by 10%;

The London Borough of Lewisham have estimated annual energy bills for these dwellings of approx. £300/home, as opposed to costs in excess of £2,000 for traditional homes. (5)<sup>5</sup>

## Brighton & Hove Council

In June 2017, Brighton & Hove's Housing Committee agreed to lease a small, part-cleared Council housing garage site next to their Housing Centre in Moulsecoomb to YMCA Downslink Group (a charity) to build modular Y:Cube homes for local single young people.

The Y:Cube is a 280-sq-ft (26-sq-m) studio-like apartment made for single occupancy. It can stand alone, or be stacked into bigger housing blocks. The units are constructed in a factory and arrive on site ready-made, with water, heating and electricity incorporated into the unit and ready to be connected to local facilities.



The HCA have allocated funding for this project, a first public consultation has taken place and will be followed by a second once further design work has taken place, prior to an application for planning consent being submitted.

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<sup>5</sup> London Assembly meeting with LB of Lewisham and LB of Harrow, 31/3/2017

The Council has 50% nomination rights to the YMCA scheme (21 units providing transitional accommodation for under 35 year olds), in return for leasing the land at a peppercorn rent (may increase once the YMCA's loan to build the units has been paid off).

### **APSE Comment**

There is an undeniable need for more housing in the UK, whether that is temporary accommodation to accommodate homeless households, social housing to address long waiting lists, accommodation to rent on the open market, or more affordable housing for people to buy. Traditional house-building methods can only satisfy these needs to a point, therefore housing providers need to embrace the many benefits technology can offer in providing faster-built, more economical, more environmentally friendly housing available through off site construction/ modular housing. Scope of modular construction designs is limitless, and is bound to lead to more innovative designs incorporating spaces for work, leisure and living.

The increase in technological advances via CAD that can be utilised to improve property construction techniques, generating economies of scale, reliable standardised construction methods with less opportunity for delays due to weather or labour shortages. The huge benefits of time saved in construction from factory-built units, means a saving in financial terms, and a quicker return on investment makes modular house construction an increasingly attractive option for local authorities.

APSE would like to see the government think about what it can do to incentivise domestic production of equipment and sustainable raw materials alongside producing a national labour strategy to support the expansion of the construction industry, recognising the current capacity constraints on delivery due to factors such as the availability of skilled workers. The government should ensure accessibility, sustainability and low carbon innovation is at the heart of a national labour strategy to ensure the British construction sector are world leaders in creating high-quality sustainable homes that enhance people's health and wellbeing.

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