



Llywodraeth Cymru  
Welsh Government

# Re-imagining social house building in Wales

A Modern Methods of Construction  
Strategy for Social Housing

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February 2020

Mae'r ddogfen yma hefyd ar gael yn Gymraeg.  
This document is also available in Welsh.



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## **Executive Summary**

### ***To build better social homes in Wales, more of them, and more quickly.***

This strategy is aimed at social and affordable housing providers in Wales. It sets out expectations relating to the production of homes built using Modern Methods of Construction (MMC), and is intended to inform leaders of local government, housing associations and private businesses. It aims to encourage leaders to take a fresh look at how to deliver new social housing, and to consider complimenting traditional construction methods with new technologies and approaches.

Welsh Government is committed to investing in housing for social rent in Wales. Given the well-documented capacity constraints faced by traditional house builders, this public investment creates the potential to accelerate the opportunity to manufacture homes in more modern and innovative ways. This is particularly true in the case of local authorities who may not have readily available development capacity to meet the Welsh Government's call to build more council homes at pace.

### ***Re-imagining social housing***

- Welsh Government will set the quality standards expected for housing that receives public subsidy, specifically with regards to space, energy efficiency and, as far as it can be defined, beauty.
- The standards will apply equally to homes built traditionally or using MMC approaches. Design, building performance and quality will be monitored through new technical scrutiny activity throughout the development process and when schemes are completed. Increased oversight will help understand value for money from homes constructed in different ways, and the information will inform the type of social and affordable homes that will be funded in future.
- Welsh Government is prepared to encourage the market, so that Welsh SMEs can develop MMC solutions, supply chains, factories, skills development centres that meet the needs of the next generation of social housing in Wales.
- It is expected that materials and components used in this next generation of MMC homes will, whenever possible, back Welsh business so that arrangements allow materials and labour to be sourced with the maximum social and ethical value to the people of Wales
- Ultimately, evidence suggests the full benefits of MMC will be realised with more volumetric approaches, but right now, most MMC producers in Wales supply

panelised systems. This strategy sets out an incremental approach to MMC adoption, which over time will see more homes, and parts of homes manufactured in this way, as part of a potential journey towards volumetric MMC housebuilding over a longer timeframe. It also ensures the industry retains the agility to respond to innovation and entrepreneurship in this nascent new industry for Wales.

- Simply put, encouraging the use of MMC for the delivery of social housing means we can provide more homes for the residents of Wales. They can be produced in a way which is good for the economy and businesses, for communities and individuals and the public purse.
- To support this strategy and deliver on our objectives, we will develop an implementation plan over the coming months which will provide greater detail on how we propose to turn our vision into tangible reality for social housebuilding in Wales.

## **1. Introduction**

- 1.1 In April 2019 the Affordable Housing Supply Review panel published their report which examined current arrangements supporting the development of affordable housing and made a series of recommendations for change designed to increase supply and improve delivery from available resources. Included in their recommendations was an action for Welsh Government to continue trialling modern methods of construction (MMC) as a means to increasing the scale and pace of affordable housing provision in Wales. The panel also recommended that Welsh Government developed a strategy to map out the use of MMC to deliver affordable housing in Wales.
- 1.2 This strategy was developed in response to those recommendations and sets out our vision for how greater adoption of MMC can be achieved and how its benefits could be realised. It was co-produced with a number of leading experts in the housing sector, construction industry and academia to explore innovative ways to increase the scale and pace of social house building in Wales.
- 1.3 Welsh Government is committed to investing in housing for social rent in Wales. Given the well-documented capacity constraints faced by traditional house builders, this public investment creates the potential to accelerate the opportunity to adopt MMC and explore the various methods, technologies and systems it offers, including use of off-site manufacturing, to produce more efficient, higher quality social homes at a faster rate than current traditional construction methods allow.

### ***How will we realise our vision for MMC in Wales?***

- 1.4 Our strategy provides clear direction on how we envisage MMC can be adopted and contribute towards our social housing goals. It highlights the benefits MMC can bring, both to the housebuilding sector and more broadly to communities. It provides a clear direction of travel for local government leaders, housing associations, and private businesses to start considering the steps they can take to maximise the opportunities MMC can offer by identifying nine key objectives that are essential to successful adoption of MMC in social housing. In broad terms, this is the first step in a long term journey that envisages greater use of MMC in social housing schemes and more advanced methods becoming more readily utilised over time. Welsh Government will set the quality standards expected for housing that receives public subsidy, specifically with regards to space, energy efficiency and, as far as it can be defined, beauty.

- 1.5 Welsh Government is prepared to encourage the market, so Welsh SMEs can develop MMC solutions, supply chains, factories, skills development centres that meet the needs of the next generation of social housing in Wales.
- 1.6 To support the strategy we are developing an implementation plan which will provide more detail on how we will deliver our nine strategic objectives. MMC is still in its infancy at this stage, with new research and evaluation tools emerging all the time. To ensure that we base our decisions on the best available evidence, we are taking an agile approach to implementation which allows us to balance the need to embrace and utilise new and innovative techniques, with the ability to learn from emerging research. The implementation plan will consider more complex aspects of the strategy and clarify finer details on aspects such as the types of MMC available, time scales for implementation and its interaction with other changes in the social housing landscape that were identified as part of the Affordable Housing Supply review.
- 1.7 Evidence shows that to yield the maximum benefits from MMC housebuilding, as much of a 'home' as possible should be constructed in a factory setting. Discussions with Welsh MMC producers demonstrate that most organisations and supply chains are geared up for more panelised systems of manufacture. This strategy reflects the current MMC product base, but with technology and time, a more volumetric approach to housebuilding and componentry may be encouraged.
- 1.8 MMC provides an opportunity for Wales to continue to be at the vanguard of new and innovative developments in social housing that have the ability to drive up standards for all housing in Wales.

## **2. What problem are we trying to solve?**

- 2.1 Traditional house building methods will not significantly increase the supply of affordable and social homes in Wales. The challenge is therefore how to build sustainable, better quality homes, more quickly and cost effectively, whilst designing them for the benefit of tenants of today and tomorrow.
- 2.2 More homes of all tenures are required in Wales. Government has the most influence over social housing and aims to create the climate to usher in a new golden age of social house building in Wales. Building new social homes at scale and pace, means social housing programmes become a vehicle to support broader Welsh Government objectives including decarbonisation, supporting the foundational economy, developing Welsh resources such as steel and timber and boosting local supply chains and labour pools. It is intended, that where social housing blazes a trail over time the private sector will be expected to follow.
- 2.3 Welsh Government is aware new and different approaches will be required to build the homes of the future. The Innovative Housing Programme (IHP) has invested in new housing schemes utilising MMC, including Off-Site Manufacturing (OSM). The programme promotes sharing information within the sector and beyond to increase confidence and transparency in new technologies and techniques.
- 2.4 Many organisations are already exploring the opportunities presented by MMC and OSM, and this document sets out Ministerial expectations to help frame the decision making of housing providers right now. We also acknowledge the actions set out to increase social housing supply through MMC will take time to put in place, but ultimately will support a flourishing industry in Wales in the following few years.

### ***“From Pre-Fab to Ab Fab”***

- 2.5 MMC for housebuilding has gained recent attention as both a policy and product because it promises to deliver housing quicker and uses a different supply chain to that of traditional housing construction. There are a broad range of approaches under the umbrella of MMC, some of which are new and emerging, and others that have been used in the UK to address demand challenges for housing in the past. Following, World War II, prefabricated (‘pre-fab’) housing utilised OSM approaches and was endorsed and used by government to provide housing for those who served or lost their homes during the war.



2.6 However, MMC and OSM technologies are considered to be far-removed from the 'pre-fab' past. The development of the technology has addressed quality, sustainability and durability issues associated with pre-fabricated units. Today, the majority of OSM manufacturers produce products which mirror the look and feel of traditionally-constructed housing and their lifespans. OSM is now intrinsically linked to quality housing (e.g. Passivhaus and Huf House) and is often perceived as upmarket, delivering grand designs and high quality housing solutions.

### ***Many factors have inhibited building at scale using MMC***

2.7 This 'new age' of MMC technology is still being refined and improved, and in many ways is relatively untested by consumers. The building landscape is awash with reports into the opportunity that current modern methods of construction potentially presents, extolling the virtues of off-site and other innovative ways of producing homes. Housing associations and local authorities across Wales have been keen to explore the potential MMC presents for building social housing. MMC can provide part of the solution to the problems currently blocking a significant increase in housing supply using traditional construction techniques, namely;

- Lack of availability of construction labour
- Performance gap between how buildings should perform and how they perform once constructed
- A lack of control in the system
- An historical aversion to development pipeline collaboration.

In Wales, the traditional approach to housebuilding is particularly challenging with an increasing shortage of key construction skills.

2.8 Current custom and practice in the sector means there is a lack of control in the development process which creates a preoccupation with upfront capital expenditure costs and less emphasis on long term operational costs over the lifespan of a home. This approach encourages lower upfront build costs that can lead to significantly higher asset management and repair costs.

2.9 Procurement models in construction typically drive low cost, rather than seeking high value/whole life cost approaches. This has made it difficult for MMC to compete like-for-like against well-established traditional house building approaches.

- 2.10 Design and Build contracts used across the sector, tend to be structured so that subcontracting inevitably occurs for a large proportion of a typical build project. This leaves the supply chain open to disruption and in turn leads to questionable quality construction that only comes to light after the building's warranty period has expired.
- 2.11 The consequences of this approach has meant a significant growth in the amount spent maintaining the existing homes, compared to the amount spent on building new houses. Off-site construction has the ability to mitigate for this lack of control through a more structured supply chain, less exposure to the fluctuations in the traditional skills workforce and factory based quality assembly processes.

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***“You wouldn’t try and precision engineer a car in a field, so why would you dream of thinking we should build quality homes there?”***

***Mark Farmer, UK Government MMC Champion, 2019.***

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- 2.12 SME financial capacity presents as a potential barrier to mass production of MMC products. With a different cash-flow profile to traditional developments, producers shoulder a higher risk burden than traditional developers.
- 2.13 There is also a perceived and untested lack of confidence from consumers including historical negative perceptions of MMC products (predominantly those which use OSM approaches).

### ***What is different this time?***

- 2.14 MMC provides clear and tangible benefits which make a compelling case for its widespread use. These include:
- Better quality buildings and infrastructure
  - A more skilled workforce and increased productivity
  - Creating more regional jobs, in areas of economic decline and away from large conurbations
  - Improved building performance
  - Improved health and safety for workers
  - Offering building safety advantages—making it easier to ensure buildings meet quality assurance standards

- Improved sustainability of buildings and infrastructure
- Reduced disruption to the local community during construction
- Adoption of a range of more innovative techniques
- Diversifying skills requirements and opportunities in the construction sector
- Protection from adverse weather and more predictable labour costs.

2.15 MMC approaches also have a key role in fuel poverty elimination, healthier homes and new approaches to retrofitting and energy innovation for decarbonisation. MMC will form a greater share of the building of new social and affordable homes in Wales, creating a blended stock portfolio for lender securitisation purposes.

### **3. The will to invest and deliver more social housing**

- 3.1 Welsh Government is pursuing policies to accelerate the pace of social housing delivery to match growing demand. This is particularly relevant to the Welsh Government's commitment to council house building at pace, as many local authorities may not currently have readily available capacity to make the step change in supply that is required. The Welsh Government has committed £2billion to housing to help deliver 20,000 new affordable homes during the current 2016-2021 term. Community Housing Cymru, the umbrella body for housing associations in Wales, launched its twenty-year '[Housing Horizons](#)' vision for Welsh housing associations in November 2017 - the vision's commitments include a pledge to build 75,000 new homes by 2036.
- 3.2 In 2018, Welsh Government instigated a comprehensive [Affordable Housing Supply Review](#). The remit of the review was to respond to a range of housing needs and to seek ways in which the scale and pace of affordable housing delivery in Wales could be increased. The review has set out a large number of recommendations with wide ranging implications for housing in Wales.
- 3.3 One of the recommendations which emerged from the review is for Welsh Government to produce a strategy focussing on how to scale up and normalise modern methods of construction (including off-site manufacturing), as well as looking at opportunities for delivering zero carbon homes.
- 3.4 This strategy has been written in the context of the Welsh Government's decarbonisation strategy and will embrace the principles outlined below. The Environment (Wales) Act 2016 placed a duty on the Welsh Government to reduce carbon emissions in Wales by 80% (over 1990 levels) by 2050.<sup>1</sup> In 2018 the Government laid a series of regulations to give effect to some of the commitments arising from the Act and set out our targets for emission reduction in Wales to 2050.<sup>2</sup> In March 2019 we published [Prosperity for all: A Low Carbon Wales](#) which formed our first statutory climate mitigation plan and set out 100 policies and proposals which will enable us to comply with our first carbon budget and create the foundations for further emission reduction. It included reducing emissions across our buildings, including in housing by

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<sup>1</sup> <http://www.legislation.gov.uk/anaw/2016/3/part/2>

<sup>2</sup> The Climate Change (Interim Emissions Targets) (Wales) Regulations 2018, The Climate Change (Carbon Budgets) (Wales) Regulations 2018, The Climate Change (International Aviation and International Shipping) (Wales) Regulations 2018, The Climate Change (Credit Limit) (Wales) Regulations 2018 and The Carbon Accounting (Wales) Regulations 2018.

investing in low carbon heating measures and encouraging behavioural change in the way we use our homes. In addition to the obvious environmental and health benefits which will be realised, these targets will allow us to guide delivery, better evaluate progress and provide certainty and clarity for investment and business.

## 4 Definitions of MMC

4.1 MMC is an umbrella term that includes various construction methods and technologies that can either replace traditional methods (e.g. using innovative technological/digital advancements such as 3D printing, drones and on site robotics) or complement them (e.g. producing components for hybrid construction that reduce resource required on-site and/or speed up assembly). As such, MMC techniques can be used both on and off-site. Some of the most common examples include:

- **Volumetric/modular:** segments of buildings manufactured off-site as three dimensional units/modules and transported to site for installation on pre-prepared foundations
- **Panelised units:** wall and ceiling panels manufactured off-site and assembled on-site to create 3-D structures. Panels can be structural or non-load bearing and either 'open' (panels delivered to site where insulation, windows, services and linings are fitted) or 'closed' (panels delivered to site which already include fitted elements such as windows, doors and external cladding)
- **Sub-assemblies and components:** Larger components that can be incorporated into either conventionally built or MMC dwellings (e.g. floor and roof cassettes)
- **Site-based:** Construction processes that are carried out on the building site, but utilise different processes, technologies and systems from those used for 'traditional' construction (e.g. BIM, robotics, drones, technology led plant and machinery).

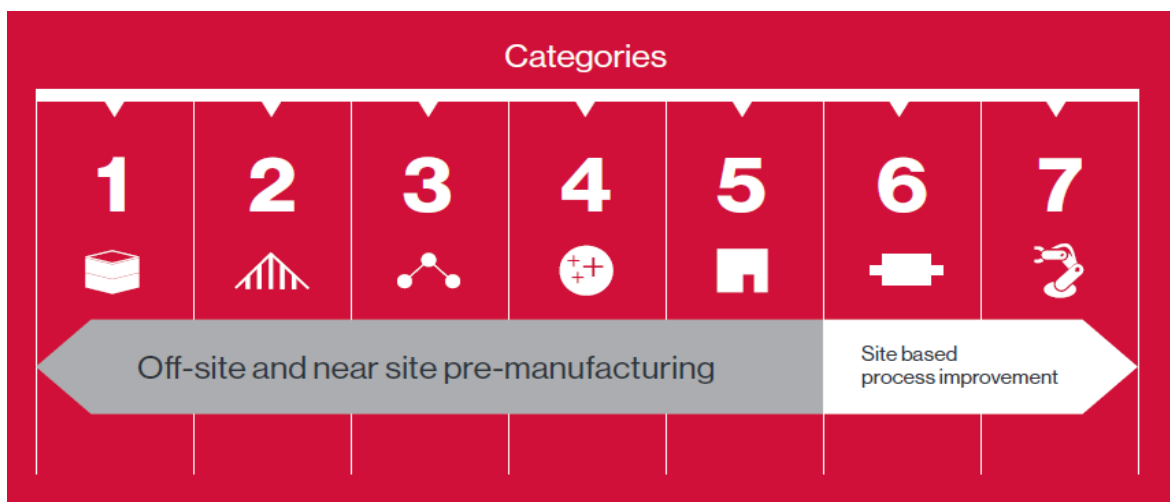
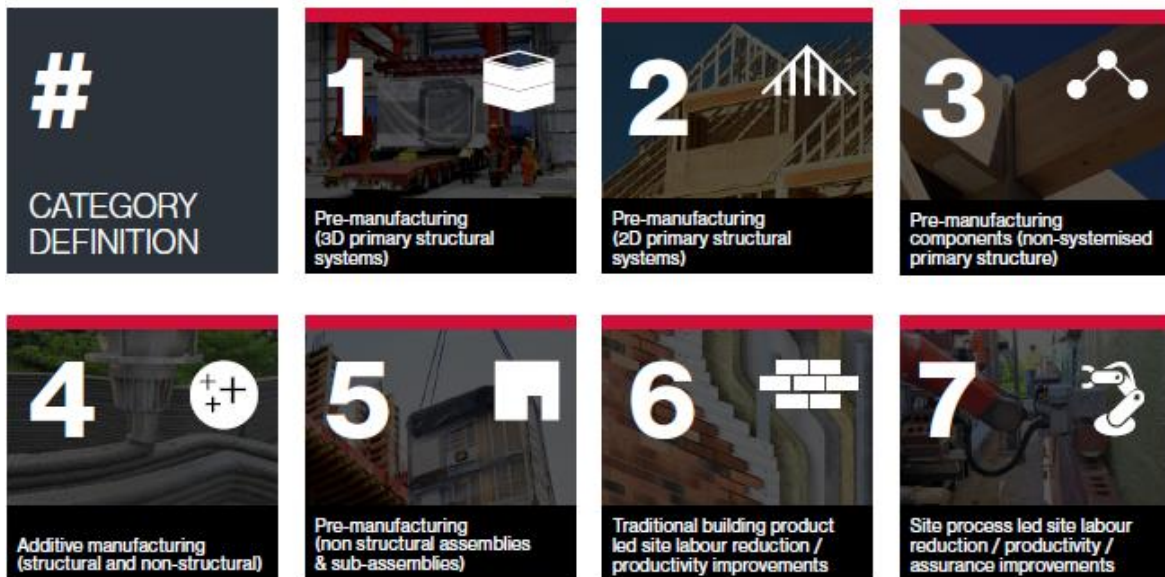
4.2 It is important to ensure definitions are clear for a number of reasons:

1. To provide clarity and consistency when communicating the Welsh Government's strategic approach to MMC
2. To help with clearly identifying and sharing the benefits and challenges of MMC to industry, consumers and the general public
3. To assist industry with identification and categorisation to encourage greater adoption of MMC techniques
4. To assist financial institutions in their understanding of MMC so that they can confidently provide relevant financial products

### The MMC definition framework

4.3 To assist with definitions we have adopted the MMC definition framework. The UK Ministry of Housing Communities and Local Government (MHCLG) Joint Industry Working Group on MMC was tasked with improving stakeholder education and understanding of MMC, with a particular focus on supporting financial organisations. A sub-group led by the chair of the working group, Mark Farmer, now UK Government MMC Champion, created the [definition framework](#) for MMC to ensure that the processes used in homebuilding could be better understood.

4.4 The framework is comprised of 7 categories mapped against an off-site to site-based spectrum.



4.5 The key benefits of the framework are that it:

- provides a standardised universal understanding of the varying current and emerging MMC processes and technologies
- provides a clear context from which to collate and build an evidence base on MMC approaches
- allows for the consistent adoption of a UK-wide industry led and approved approach to MMC classification



## **5 UK and Welsh position**

### ***The UK Position***

- 5.1 The UK Government recognises that the construction sector as it is currently constituted cannot efficiently meet the need for housing delivery. In July 2018 the select committee report '[Off-site manufacture for construction: Building for Change](#)' outlines how off-site manufacturing could help the sector to meet our housing needs. The report details how off-site manufacturing provides clear and tangible benefits which makes a compelling case for its widespread use.
- 5.2 The UK Government, as well as the Welsh Government, recognise that the take up of off-site manufacture is varied and in certain parts of the sector has been limited. Action is required by not just the sector but by government if more MMC homes are to be built as part of social housing development programmes.
- 5.3 The publication of the UK Government's [Construction Sector Deal](#) is an important step forward for off-site manufacture and the wider construction sector. As well as its announcement of a 'presumption in favour' of off-site manufacture for certain infrastructure programmes, in November 2019, the UK Government announced Mark Farmer as the new 'Champion for MMC in housebuilding'. The role will provide independent scrutiny and advice to the UK Government on how to increase use of MMC in housebuilding as well as act as an ambassador for UK MMC activities overseas. The UK Government is showing a strong commitment to investing in MMC.

### ***The Welsh position***

- 5.4 We are committed to increasing the use of MMC across social housing developments as part of our wider efforts to address housing needs in Wales, helping us to build sustainable homes for the future faster and more efficiently.
- 5.5 This is a new and emerging landscape and as such it is right to apply an iterative and agile approach to implementing our key objectives. This means taking a long term approach to incrementally introduce more advanced methods of MMC overtime, starting with systems that are more easily incorporated into development schemes, such as frame and panellised solutions, with a view to accommodating more advanced methods, such as volumetric MMC, once the market and perspectives have sufficiently adapted for them.

5.6 Our approach is based on high sector engagement and research relating to the current and future capability of SME MMC providers based in Wales. We want to continually understand where our supply chains are located, the range of MMC techniques that are currently in use, ambitions for growth and diversification of product, and to understand potential barriers to expansion. By way of example, we know that the vast majority of current MMC providers in Wales offer frame and panel based systems. The vast majority of these are timber based open frames with a number offering more enhanced panel solutions that include insulation and internal linings. It would be unrealistic to think that we should move too fast too soon. This is the first step in a journey towards incrementally embracing more advanced methods as our understanding of MMC techniques matures.

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***OUR VISION is to reimagine how new social homes are built in Wales***

***OUR SOLUTION is to build better social homes in Wales,  
more of them, and more quickly.***

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## **6. Key Objectives**

The aim of this strategy is to focus resources to deliver more social homes using MMC and in doing so, help develop the supply chain in Wales.

Welsh Ministers will support MMC in Wales in the following ways:

### **6.1 Standardise rings of assurance, warranties and accreditation to support lender and third party confidence in MMC**

The provision of warranties and guarantees is key in gaining confidence in MMC homes. UK-wide assurances and definitions will be adopted in full. This will ensure uniformity of quality marques for lenders, valuers, and insurers in order to support investment into homes built using MMC in Wales. Over time, these warranties will become standardised across the UK and it will be the responsibility of organisations to apply for and gain appropriate accreditation for their products. We will explore the development of a unified technical assessment platform.

### **6.2 Set standards for all social new build homes in Wales**

Whilst the broad benefits of MMC are widely acknowledged, at this time it is an emerging, immature producer market in Wales. There are a good number of producers, which can provide MMC homes and form a growing proportion of Welsh housing development pipelines. Nonetheless, the majority of social and affordable homes at this juncture are still likely to be built using traditional construction methods.

In order to fully realise the opportunities presented by MMC, and address some of the issues identified with traditional construction methods, Welsh Government favours a standards approach to drive up the quality and number of social and affordable homes in Wales.

It is important to set out the Welsh Ministers' expectation for housebuilding because it is much easier to design in these factors at the start of a process, than at the end. With a number of SMEs looking to establish themselves as developers of social homes in Wales, expectation will be made be clear at the outset.

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- **From ‘Pre-Fab to Ab Fab’: manufacturing homes the Welsh Way**

To qualify for Welsh Government investment, all social and affordable homes produced must meet the proposed Beautiful Homes and Spaces (BHS) requirements (currently Development Quality Requirements - DQR). We are proposing to revise the standards to include an expectation that MMC systems will be considered and used where possible. The standard will be regularly refreshed to reflect the quality of homes the Welsh Ministers wish to see built. Welsh Ministers will set the standards expected for MMC solutions that receive public subsidy – the market will be expected to come up with the innovative solutions that meet those standards.

Constructing well vetted designs with a controlled workforce off-site has the potential to improve build quality. The new BHS will balance the tension between the need for greater control in construction in Wales and the need for flexibility to innovate. Rather than a ‘presumption of favour’ for either traditional or MMC approaches to homebuilding, the playing field will be levelled - all social homes which meet the standard will have the opportunity to apply for Welsh Government investment to build homes, however they are produced.

- **Increased oversight, increased quality**

MMC offers significant improvements in the delivery of homes and assists in closing the construction “performance gap”. This is the gap between how the building is supposed to perform, and how it performs in reality.

Judging the final results of the construction process, not the means of construction, treats traditional home builders and MMC producers equally. All new social and affordable homes will be near zero carbon emissions. They will all need to meet our space and quality standards. These standards relate directly to the wider ambitions of Welsh Government to deliver a ‘Low Carbon Wales’. In the context of construction, this includes tackling carbon emissions directly through reducing and decarbonising energy demand. The Welsh Government Construction and Demolition Sector Plan (2012) recognised the benefits that MMC could contribute by reducing material waste in the construction process, citing research that estimated that modular homes could reduce construction waste by 70-90%.

As part of BHS, it is expected that homes will utilise circular economy processes by choosing construction materials that can be recycled, contribute to carbon reduction targets and meet specified space standards. In December, we consulted on a [strategy](#) to make the circular economy in Wales a reality and recognises the achievements to date on recycling, but also acknowledges the climate emergency declared by the Welsh Government.

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The consultation focusses on keeping resources in use for as long as possible, reducing waste and sets out our targets to transform the recycling of commercial and industrial construction waste. The consultation also sets out how we will prioritise the use of sustainable and low carbon materials in construction in Wales and we aim to apply this to the Innovative Housing Programme and the refurbishment of the social housing stock in Wales.

In addition, a revised approach to Welsh Government post-scheme technical scrutiny of social housing grant aided schemes means comparison between traditional construction and MMC will be possible on a like-for-like basis. It also resolves the quality argument, commonly put forward by MMC providers that their products achieve a higher standard than traditional build methods. It will enable traditional house-builders to reassure Ministers of the quality of the homes they build. As well as checking quality, post scheme technical scrutiny will also review value for money.

For traditional house-builders, there will need to be an enhanced focus on consistently delivering quality homes. For MMC producers, post scheme scrutiny removes the potential to hide higher prices behind a 'better quality' argument.

The 'standards' based approach therefore represents a delivery neutral solution. It allows the best quality MMC as well as the best of traditional construction to deliver a high quality built environment, but leaves house-builders and producers free to innovate and drive the market.

Housing providers should be able to demonstrate the integration of technologies such as those developed by the Innovative Housing Programme into new homes. Ideally these should be designed-in from the start of the manufacture process. Whilst the technology, particularly if it is emerging, will increase costs initially; integration and adoption within the manufacturing process will help to reduce cost over time.

- **Monitoring Building Performance**

MMC presents the opportunity to manufacture using technologically advanced methods to consistent and testable standards. Standardising components can improve the quality of those components through iterative testing of their performance, analysing this data and adjusting for future production. Digitising manufacturing and assembly processes results in more precisely constructed end-products with maximised performance, and less time spent 'snagging'.

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We will monitor the performance of MMC produced homes and the tenant experience of living in them. UK-wide MMC performance metrics will be adopted. Information will be gathered over time to become a significant social housing MMC performance data set in the UK. The data will allow the Welsh housing sector to access and share non-commercially sensitive information about building using MMC approaches.

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### **6.3 Explore high value rather than low cost procurement models to reflect whole life costs of new build and provide more development options for housing providers**

We recognise that it is not possible to change technologies of production without changing business and procurement models. Different approaches to procurement are required to facilitate more homes being built by MMC. Models of procurement which support clients and specifiers to make decisions, in turn supporting Welsh business and the local economy rather than actively work against it, will be explored and supported. Procurement models should focus on 'whole life' costs, rather than up front-costs and be less restrictive, less risk averse and favour high value, rather than a race to the bottom with low cost. Value for money remains important, but not if the cheapest cost means sacrificing good design or sustainability and longevity of a home.

Housing providers spend more on maintaining existing stock than building new homes. 86% of the average UK home expenditure relates to its maintenance. Promoting the use of 'future cost' modelling in construction contracts for social housing developments, could assist in reducing future maintenance costs.

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### **6.4 Develop standardised approaches to design and manufacture to drive up volume, drive down cost and build more homes**

- **Beautiful design**

Beautiful design will be expected as standard. Standardisation in the manufacturing process does not mean homes should be unattractive homogenous boxes which are undesirable to live in. Homes should be designed to meet the needs of people with permanent, temporary, situational, or changing physical ability. Homes funded with Welsh Government investment should aspire to create attractive homes and spaces that tenants can be proud of.

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In order to save time, reduce waste and build homes people wish to live in, Welsh Ministers wish to see demonstrable evidence of how tenants' views have influenced the design of homes produced by MMC. Tenants know what they like and do not like. Ministers expect tenants to influence the design elements which matter to them. It will be for each commissioning social landlord to involve tenants in home-design the way which is most appropriate for their organisation.

When schemes are put forward for social housing grant funding, the Welsh Government technical scrutiny team will consider how tenants' views have shaped the scheme.

- **Ready-to-use design and standardisation**

Standardisation and repetition work particularly well with MMC manufacture. Some MMC systems are optimized when used in conjunction with standardisation (e.g. volumetric units), whereas others are inherently more flexible (e.g. panellised systems). It is expected that a balance between standardisation and customisation should be achieved.

Whilst we will initially rely on our standards approach and leave it to the sector to develop products that meet our requirements, once the MMC market matures, in order to fully extract the benefits of design for manufacture and to enable a systems-based approach to production, we will explore the possibilities of standardisation across various systems and whether it is preferable to develop a 'chassis' approach as demand for MMC homes increases over time. Using the commonplace car production model, the design for manufacture and assembly (DFMA) approach allows advanced manufacturing of the chassis, with a componentry platform which shares a common supply chain. At the end of production, the product can be individualised with a range of looks, finishes and feature combinations.

Standardisation and precise material sizing results in less waste during production while fewer personnel and materials movement during manufacturing processes mean less congestion and air pollution. Precise manufacturing and assembly using digital testing (including of air leakage) mean more air-tight buildings with better efficiency performance than those of traditional construction methods. This is increasingly important in Wales where in-building efficiency, decarbonising the construction process and eliminating fuel poverty remains a priority.

Standardisation will drive down the cost of homes, but not at the price of quality. We expect social housing to be customised in the MMC process to provide appropriate design and bespoke elements of visual diversity in the housing landscape. On the surface, MMC produced homes will be indistinguishable from

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traditionally constructed homes. The difference in production will only be discernible in how tenants may need to behave and live in them to reap the full benefits of an MMC produced home.

Nonetheless, some tenants, particularly the more vulnerable, may not be familiar or comfortable with the features of innovative systems that easily lend themselves to be included as features in MMC homes. It is therefore expected homes produced using MMC and benefiting from Welsh Government investment will be let as part of the local authority housing allocations scheme taking account of the individual household's preferences to engage with this technology. Landlords will need to consider the needs of each household, taking a person centred approach particularly where there are issues of vulnerability, when allocating a MMC built home. Tenants must be able to choose whether to accept a new build home produced by MMC or not, with no adverse consequences to their position on a shared housing register or allocation scheme.

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## **6.5 Identify and coordinate skills and qualification requirements to support greater use of MMC**

There is a recognised shortage of skills in all areas of the construction sector in Wales. This is also a factor where MMC is concerned and it is important that the sector is properly and adequately skilled in order to meet our strategic objectives. This requires us to upskill our current workforce with the skills and experience required for MMC as well as ensuring we provide the right qualifications for future entrants to the sector. The broad range of MMC systems means that the skills requirement is mixed and varies from lower skills than traditional construction requires for manufacturing processes and more advanced digital skills for use of Building Information Modelling (BIM) and other technologically advanced plant and machinery. Young people entering the workplace need to be equipped with the broad range of skills for MMC including construction, manufacturing and digital skills. It is important that the requirement is reflected in post-school training provision, but also in the school curriculum so that the next generation have the basic skills necessary to undertake more specialist training.

There are a range of emerging qualifications, sector-led research publications and funding streams that recognise the need to address MMC skills requirements however, more could be done to bring these aspects together to form a coherent plan to address skills requirements. We also recognise that the will to develop MMC specific training and qualifications is led by sector demand, the more that can be done to encourage greater take up of MMC in housebuilding, the greater

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the incentive for companies and training institutions to invest and respond to demand. We need to ensure that this sequence of events does not leave us in a position where the demand has outpaced skills capabilities. To counter this, Welsh Government will seek to bring together stakeholders such as Qualification Wales, the Construction Industry Training Board Wales (CITB), the Construction Wales Innovation Centre (CWIC) and Wales' three Regional Skills Partnerships, to ensure labour and skills requirements are appropriate for the MMC sector.

In addition to skills provision, there is work to be done to improve perceptions of the types of jobs available in the construction sector, which are currently based on the skills needed for traditional construction. MMC provides an opportunity to showcase the broad range of new and innovative careers available in order to attract a new and diverse workforce, including encouraging more women and younger entrants to the construction sector. Work with training and education providers will include drawing on existing plans and reviewing existing careers platforms to support construction careers and promote the new types of careers in construction to the next generation.

We also recognise it is important, at least in the short term, for us to adopt a dual focus on both MMC and on-site traditional methods in recognition of the fact that greater use of MMC will take some time to embed and is likely to be used in a hybrid approach alongside traditional methods, including maintenance of our existing traditionally built housing stock in Wales. The success of incremental uptake of MMC is reliant on a strong and sustainable construction sector.

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## **6.6 Support the manufacture of homes in Wales, in a way which contributes to broader governmental social and economic ambitions**

MMC is more than just a house building opportunity; it's about the way the homes of the future can be built to have the most benefit for the people of Wales. It is expected that housing providers can demonstrate excellence not just in home design and quality, but in how their production supports the Welsh nation, and the well-being of future generations.

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- **Creating opportunities for Welsh business**

As part of our Brexit mitigation strategy we will seek to develop a buoyant local MMC industry and its supply chain. Organisations should aim to build homes in new ways to maximise local supply chains and employment opportunities.

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***It is expected that the supply of labour, materials and components selected for MMC social homes delivery should be considered in terms of their social and ethical value to meet our obligations under the Wellbeing of Future Generations Act 2015.***

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Whilst we will seek to ensure that Wales based businesses get every opportunity to compete, measures to maximise local supply chains for the delivery of MMC social homes will need to be considered in light of current procurement and EU State Aid regulations.

- **Welsh timber**

At present, most MMC providers in Wales offer frame and panel based systems. The vast majority of these are timber based open frames, with a number offering more enhanced structurally insulated panel solutions (SIPs). Whilst we want to work towards developing more advanced and innovative MMC systems, the current MMC landscape provides an opportunity to champion use of Welsh timber for use in construction and debunk some of the myths around the unsuitability and quality of Welsh timber. Due to its potential to support the circular economy in Wales and its important role in contributing to decarbonisation, timber will become increasingly important to utilise in MMC, and expected to be maximised in the manufacturing process.

Wood is the only widely available highly developed industrial material whose greater use in construction could help to mitigate climate change. In general, it takes less energy to convert trees into useful construction products when compared to other materials. Equally the use of wood creates a long-term store of carbon in the built environment. New engineered wood products such as glulam are enabling timber to move from low-rise into medium-rise.

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***“Is timber the wonder construction material of the 21st Century? Wood is the only widely available highly developed industrial material whose greater use in construction can provide a significant part of the climate change solution “.***

***Confederation of Forest Industries, 2019***

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The rise of off-site manufactured housing is providing a high-value market for Welsh grown and processed timber and can be expected to become a key driver for forest expansion in Wales. This in turn can deliver much needed jobs in forest management and wood processing particularly in rural areas. The continued rise of manufactured housing provides the potential to create reliable flows of timber from forest to factory allowing for regional integration and delivering substantial benefit to the Welsh economy.

The Welsh timber industry is well placed to play a pivotal role in the construction of social homes in Wales now and in the future. MMC can act as a driver to demand the use of more timber in Welsh manufacturing supply chains in the medium and long term and sustainable commercial forest management.

Our circular economy consultation also states that, in terms of public sector procurement, we plan to prioritise the use of wood and recycled content as well as prioritising re-used and remanufactured content in the goods purchased by the public sector.

- **Who will manufacture MMC homes?**

MMC presents an opportunity to create new employment, especially in communities hit hardest by economic and industrial decline. A vibrant MMC market can support our construction and manufacturing sectors helping to create and safeguard local jobs in these important sectors and meeting the aims of our strategy, [Prosperity for All: Economic Action Plan](#). MMC production relies on a mixture of precision application of low skills and more advanced technological and digital knowledge, depending on the MMC system in use. Consequently, in some cases, perceived barriers to entry are different to traditional construction trades and it is expected that a more diverse workforce will be engaged in new home production. MMC presents an opportunity to welcome new entrants and underrepresented groups, including those furthest from the job market, into the construction sector.

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In addition to diversifying the types of employment opportunities available, MMC can also deliver *safer* employment. Construction is ranked in the top five most dangerous industries in the UK in terms of injury and fatalities.<sup>3</sup> Health and Safety Executive (HSE) statistics indicate that the serious and fatal injury rate in construction is around four times as high as the average rate across all industries, including the manufacturing sector.<sup>4</sup>

Off-site manufacture moves a greater proportion of the end-to-end delivery of new housing into climate-controlled factory environments, reducing exposure of both the workers and products to dampness and temperature changes. Process engineering reduces the chances of hazards, injuries and accidents.

- **Collaboration with HMP - MMC in the community**

Within the Welsh prison estate there is the opportunity to provide the UK's first multi-skilled, construction academies for men currently serving custodial sentences. These will provide offenders with the skills required to complete every part of a home build, from the foundation upwards. Collaborations have already been formed with MMC providers, including organisations at the forefront of modular housing advances and this could be further expanded. Existing skills provision within prison can be redirected to support local skills gaps and the needs of our employment partners. This will include NVQ's, CSCS cards, on the job training and City & Guilds diplomas.

Meaningful work changes lives. It provides purpose, structure, support networks and financial security. Time spent in prison is an opportunity to engage people with employment, generate new skills and create routes out of re-offending. For offenders that are committed to change and want to turn their lives around, work placements can serve as a pathway to a better life. For those willing to engage, the system could ensure that when an offender enters prison they are put, immediately, on the path to employment on release. This means:

- Rigorous assessment of each prisoner's education level at the beginning of and at key points during their sentence, to understand each individual's starting point and measure progress.
- Education and training which is responsive to individuals' needs, is properly integrated into prison regimes and delivers what employers are looking for.
- Prison work, provided by employers with easy access to prisons and work placements on day release which help prisoners build towards employment opportunities on release.
- Impact on reoffending.

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<sup>3</sup> <https://www.hse.gov.uk/statistics/fatals.htm>

<sup>4</sup> Health and Safety Executive, Workplace fatal injuries in Great Britain, 2019, pg 5.

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Recent Ministry of Justice research<sup>5</sup> has shown that reoffending rates drop by around 50% for men with P45 employment in the first year after release. This creates real savings to the public purse, as across the UK, reoffending costs the taxpayer around £18 billion per year.<sup>6</sup>

Data published by the Ministry of Justice and Department for Work and Pensions (DWP) in 2014 showed that 28% of Jobseeker's Allowance claims were made by individuals who had been convicted or cautioned.<sup>7</sup> As well as financial costs, there is the wider human cost to families and society. In 2015–16, 38% of adults convicted of an indictable offence already had a long criminal record.<sup>8</sup>

Historically, the construction industry has provided a stable, non-judgemental working environment for ex-offenders. The ambitious infrastructure pipeline in Wales requires skills beyond what is currently available. By harnessing the talents of offenders, MMC can help create safer communities and give Wales a workforce with the flexibility and capacity to meet future demand. In addition, there are many benefits to employers of working with prisoners and ex-offenders including resolving skills shortages, reducing recruitment costs and increasing staff retention rates.<sup>9</sup>

- **Better jobs closer to home**

The Welsh Government's Better Jobs, Closer to Home Programme seeks innovative ways to create jobs, through more effective utilisation of the Welsh Government's £6bn annual procurement budget spent on works, goods and services.<sup>10</sup> Our vision for MMC and its focus on the circular economy and adopting an approach to support businesses can also support this important initiative. Temporary production arrangements such as 'flying factories' to support OSM practices, can be located near to housing developments and create jobs in rural areas and areas of economic decline and allow individuals to access local,

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<sup>5</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/217412/impact-employment-reoffending.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/217412/impact-employment-reoffending.pdf) table 1, page 3

<sup>6</sup> <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/work-and-pensions-committee/support-for-ex-offenders/oral/42417.pdf>  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/814650/economic-social-costs-reoffending.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/814650/economic-social-costs-reoffending.pdf)

<sup>7</sup> [Experimental statistics from the 2013 MoJ/DWP/HMRC data share: linking data on offenders with benefit, employment and income data](#). Claims as at 1 December 2012. These statistics are experimental. As not all offenders were included in the matched data, these are likely to be under-estimates for the total number of individuals in the matched data claiming benefits on 1 December 2012.

<sup>8</sup> [Criminal Justice Statistics Quarterly Update to March 2016](#). Long criminal record = 15 or more previous convictions or cautions. Economic & Social costs of reoffending, 2019 *Ministry of Justice*

<sup>9</sup> <https://www.gov.uk/government/publications/unlock-opportunity-employer-information-pack-and-case-studies/employing-prisoners-and-ex-offenders#reasons-to-work-with-prisoners-and-ex-offenders>

<sup>10</sup> <https://record.assembly.wales/Plenary/4987#A43887>

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meaningful employment, that also contributes to place-making and regeneration in their localities.

Building on existing work under Welsh Government's forestry strategy – [Woodlands for Wales](#) and ambitions to become a Forest Nation, MMC provides an opportunity to boost jobs and economic growth in the timber sector and its local supply chain.

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## 6.7 Collaboration and partnerships

To fully realise the potential of MMC to build better homes, and deliver positive outcomes through the construction process organisations are expected to collaborate.

Combining the dispersed knowledge within the housing sector from residents and asset managers, combined with leading architects and off-site/MMC providers will be a game changer for housebuilding in Wales. Leveraging the collective buying power of the housing and public sector has the potential to unlock significant savings in both time and costs, resulting in more homes for those who need them.

Combined housing development pipelines should be established, housing associations and local authorities will be expected to take the initiative and form effective collaborations which benefit both parties

Authentic collaboration is to be encouraged between local authorities and housing associations, between housing providers and SMEs, between private off-site manufacturers, and between different parts of the public sector.

Private sector organisations are encouraged to explore opportunities to share overheads, supply chains and labour pools with competitors. This approach will best leverage the opportunity to provide standardisation, embrace DfMA practices, establish regional hubs and centres of excellence and share learning to benefit the MMC market in Wales. At this stage of the emerging MMC market there are opportunities for a variety of MMC actors and enablers to collaborate and accelerate their contribution to increasing social housing supply.

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## **6.8 Provide support to Welsh MMC producers and their supply chains to help the industry grow and flourish**

- **The Economic Action Plan - support for MMC manufacturers**

Supporting Welsh MMC producers and their supply chains in the manufacturing and construction sectors is key to the delivery of new social and affordable homes in Wales. As the MMC market continues to mature and more technological advances are made to housebuilding, Welsh SMEs are well placed to respond to market conditions. There is a recognition that there is an experienced and capable MMC industry in Wales already providing products and innovative solutions for projects in the commercial, education, and private development markets. We need to harness and nurture these businesses to respond to the challenge of building more social homes in Wales for the residents of Wales.

Welsh Government will seek to support MMC businesses through:

- Facilitating access to financial support to assist with capital investment in factories and plant to grow and sustain businesses in Wales.
- Access to skills, expertise and resource to get onto procurement networks and bid for contracts to secure constant pipeline
- Encouraging the use of vesting certificates alongside an appropriate payment structure will be supported. These share the risk between parties, as opposed to it lying with SMEs alone and ensures the asset is owned by the housing provider at point of payment.
- Promote 'Project Based Accounting' (PBAs) and specialist cash flow models which are tailored to support advanced manufacture, and can replace traditional development cash flows
- Providing grant funding certainty to housing associations, to help manage their development pipeline. A forecastable order book for new homes manufactured off-site will support the investment of private capital into factories by creating sustainable factories.

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## **6.9 More than just housing**

While this strategy focuses on bringing forward more MMC to help increase the supply of social homes in Wales, there are additional considerations that require attention and resolution if we are to achieve our objectives.

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A renewed focus on land availability and site suitability needs to be considered. The formation of a Welsh Government land division will help supply new sites as the lack of land supply is one of the primary obstacles to increasing the supply of homes. This will complement the existing land protocol. There is the opportunity to bring forward more public sector land at below market rates for social housing, at prices which mean more housing developments are financially viable.

More land suitable for modular construction is required to bring forward more homes. Sites will need a short initial assessment to ensure suitability for modular, taking into consideration design for manufacture and assembly to ensure, for example, that cranes and modules can be delivered to site.

In addition to the considerations outlined above, additional areas of focus are:

- aspects of the planning process
- encourage more local groundworks companies to get into residential sites preparation
- utility provision to sites in a timely fashion as the scale and pace of building increases

We are engaging with the various functions of Welsh Government and other external agencies responsible for these areas to identify any changes or improvements that can be made to help facilitate our objectives.

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## **7 Next steps**

- 7.1 Greater adoption of MMC provides an exciting opportunity to reshape and redefine the way we think about, design, build, and ultimately live in social housing in Wales. It allows us to challenge outdated and unimaginative approaches to ensure that we continually question whether we are providing the best housing for those in the highest need. The tenant must remain at the heart of our efforts to reform the social housing landscape.
- 7.2 As our strategy makes clear, not only does MMC play a critical role in allowing us to meet housing need, it is also directly aligned with a number of other key areas of reform and focus for Welsh Government, including our efforts to tackle climate change, developing a safer, more resource efficient and technically skilled construction sector and equipping local authorities and housing associations with the tools and support to create environments and communities that current and future generations aspire to be part of.
- 7.3 To help us realise our vision for MMC we are developing an implementation plan over the coming months which will provide additional detail, guidance and tools to turn our strategic objectives into tangible reality. We will continue to use a co-production approach to developing our plan, as we recognise that our wide range of stakeholders have not only played a critical role in shaping our vision to date, but ultimately hold the keys to successful operational delivery.
- 7.4 We recognise the scale of the challenge, but we also believe this is the right direction of travel and allows social housing to blaze a trail for the wider housing sector to follow and ultimately work towards building better homes for a better Wales and a better world.

