



**An Roinn Fiontar,
Trádála agus Fostaíochta**
Department of Enterprise,
Trade and Employment



**An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreacht**
Department of Housing,
Local Government and Heritage

Roadmap for increased adoption of Modern Methods of Construction in Public Housing delivery

**Housing for All
Priority Action 13.2**

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Foreword

The Government's *Housing for All* Action Plan Update articulates a critical need to enable a continuous and accelerated flow of compliant and high-quality innovations in construction, including modern methods of construction (MMC), particularly in residential construction. This is to ensure delivery of *Housing for All* targets and the ongoing transformation of the construction sector. It also facilitates efforts to reduce the embodied carbon and lifecycle environmental impacts of construction.

This *Roadmap for increased adoption of Modern Methods of Construction in Public Housing delivery* recognises that the Government needs to lead by example in progressing the most advanced and efficient construction methods in the delivery of housing. In so doing it must also help to address the challenges that create barriers to entry for innovative solutions in housing delivery.

The recommendations identified in the Roadmap reflect the need for collective action across the construction ecosystem, including public and private sector actors, to create the conditions for MMC to thrive. A key measure to support the initiative is a programme of accelerated delivery being overseen by the Department of Housing, Local Government and Heritage, which will see over 1,500 new social homes commence construction during 2023 and 2024, utilising various MMC building systems. This agenda for action forms part of the continued work with the sector and with partners across Government, the private sector, academia and others to continue to find ways to deliver homes more efficiently, more sustainably and with lower cost.

Since the commencement of *Housing for All*, and complementing this Roadmap, the Government has advanced a range of initiatives to drive innovation and productivity in construction; including the establishment of the *Construct Innovate* Technology Centre; the roll out of innovation and productivity supports to domestically focused residential construction companies and the offsite manufacturing supply chain under Enterprise Ireland's *Built to Innovate* initiative; and the forthcoming development of a national Demonstration Park for MMC. The Department of Enterprise, Trade and Employment is leading a cross-Department and cross-agency MMC Leadership and Integration Group to ensure coordination across a range of MMC entities and initiatives and will continue to examine ways of further enabling innovation adoption in the delivery of housing.

Simon Coveney TD



Minister for Enterprise, Trade and Employment

Darragh O' Brien TD



Minister for Housing, Local Government and Heritage

Executive Summary

The overall aim of *Housing for All* is that everyone in the State should have access to a home to purchase or rent at an affordable price, built to a high standard and in the right place, offering a high quality of life.

Housing for All recognises that, to meet with this objective, the Irish construction industry must have the capacity to deliver the required new homes as efficiently and environmentally sustainable as possible. More widespread adoption of Modern Methods of Construction (MMC), an umbrella term for a range of innovative construction processes, is a key pillar of the Government's approach to increasing innovation adoption and achieving productivity gains in the delivery of housing. MMC represents a significant ongoing transformation in construction, incorporating increased levels of offsite manufacturing and assembly; new technologies, products and building systems; and increased digitalisation. Though factory-based offsite construction methods are not new, ongoing technological advances, the advent of digitalisation and the environmental sustainability imperative are promoting continued evolution of the construction sector to deliver quality housing.

As a more sustainable and more productive form of construction, widespread adoption of MMC furthers other national policy objectives; including the White Paper on Enterprise 2022-2030; Impact 2030, Ireland's national innovation strategy; the Climate Action Plan; the National Development Plan; the Whole of Government Circular Economy Strategy; and the Waste Action Plan for a Circular Economy.

Fully realising the benefits of MMC approaches to deliver compliant, quality housing requires ecosystem-wide adjustment. Recent experiences in the UK and elsewhere also underline the importance of ensuring resilient business models to underpin the shift to MMC processes.

Under *Housing for All*, a range of initiatives are underway to support innovation and enhanced productivity in housing delivery including: the establishment of the Construct Innovate Technology Centre led by University of Galway; the rollout of 'Built to Innovate' by Enterprise Ireland which extends innovation and business transformation supports to the domestic residential construction sector; the forthcoming establishment of a MMC Demonstration Park at Mount Lucas, led by Solas and Laois-Offaly ETB; and the Build Digital project led by TU Dublin.

This document sets out the roadmap for increased adoption of MMC in public housing delivery. It reflects the role that public procurement can play in leading system transformation. As a major procurer of construction services, the State has a significant presence in the market. In the context

of the social and affordable housing delivery targets in *Housing for All*, public procurement will account for a significant portion of the demand pipeline for residential construction services over the next decade. In recognising the opportunity that increased deployment of MMC presents, public procurement must play a key role in setting out the State's demand for innovative approaches to enhance delivery and accelerate the necessary ecosystem-wide enablers.

The Roadmap for MMC has been developed by the Department of Enterprise, Trade and Employment (DETE) and the Department of Housing, Local Government and Heritage (DHLGH) working with the interdepartmental MMC Leadership and Integration Group, which reflects the cross-cutting nature of the work. The move to progressing MMC represents a major public sector innovation and transformation initiative, working with private sector clients, design teams, manufacturers, and builders, that will continue to support change in how public housing is considered and procured. The move to MMC will help to reduce costs, drive faster delivery times, and increase construction sector productivity and sustainability, while maintaining high quality. It will support an increase in diversity in the construction workforce, and improve sustainability and circular economy outcomes, including onsite and offsite waste reduction.

The Roadmap recognises that collaboration is key to achieve progress and the MMC Leadership and Integration Group is committed to exploring what more can be done to promote the widespread adoption of MMC in residential construction in Ireland.

A significant step in the context of this Roadmap is the roll out of the Department of Housing, Local Government and Heritage (DHLGH) and Local Authority led Accelerated Social Housing Delivery Programme (*Housing for All* – Priority Action 4.3) which is targeting delivery of at least 1,500 social homes leveraging MMC approaches in the period to the end of 2024. Further projects will be added incrementally as procurement approaches are refined further. The supporting measures outlined across the thematic areas addressed in this Roadmap will encourage and enable similar initiatives across the range of delivery channels, including the new Social Housing Public-Private partnership Programme, Approved Housing Bodies, the Land Development Agency, and student accommodation delivery.

The key points set out in this Roadmap are aimed at enabling a broader range of innovative solutions for housing delivery, building confidence about MMC demand, and boosting Ireland's MMC capacity, by:

- Expanding the use of a Design and Build procurement approach as an initial step to enable greater use of MMC in social and affordable housing delivery;

- The roll out of a programme of Accelerated Delivery by the Department of Housing, Local Government and Heritage (DHLGH) and local authorities (LAs) that will deliver at least 1,500 new build social homes utilising Design and Build and MMC which will commence construction on-site during 2023 and 2024;
- Supporting LAs and AHBs to acquire sites to further expand the proportion of ‘own build’ in the social housing delivery programme, with a focus on MMC on these sites;
- Accelerating design standardisation for residential construction with reference to the *Design Manual for Quality Housing*;
- Introducing a pilot project to deliver social, or affordable, housing using 3D volumetric systems;
- Developing accredited training programmes, to address identified skills gaps in Modern Methods of Construction (MMC) for construction sector professionals;
- Introducing training interventions for Building Control Authorities (BCAs), which would include training on relevant standards and certification processes, to address any MMC knowledge gaps;
- Promoting the National Standards Authority of Ireland (NSAI) Agrément certification and inspection services, and strengthening capacity within the NSAI to support an efficient Agrément process;
- Accelerating reskilling of the existing construction workforce in MMC, developing the Demonstration Park for MMC, consolidating information on MMC courses currently available and accessible via the SOLAS website, and responding to the forthcoming EGFSN report on MMC Skills needs; and
- Boosting industry competitiveness and capacity through:
 - Increasing engagement with Enterprise Ireland’s *El’s Built to Innovate* programme by the MMC construction supply chain, homebuilders and building contractors;
 - Commencing delivery of targeted leadership development training for the residential construction sector to strengthen company leadership, change management and financial management capabilities.

Summary Roadmap

Milestone	Timeline	Owner
Development and further roll out of procurement approaches to enable MMC		
1	Continue the expanded use of a Design & Build procurement approach as an initial step to enable greater use of MMC in social and affordable housing delivery and undertake briefing events arranged for industry to support participation in procurement competitions	Underway DHLGH/ LAs/ AHBs
2	Project management team appointed to coordinate LA MMC procurement best practice.	In place DHLGH
3	Pilot project initiated to deliver social, or affordable, housing using a 3D volumetric system (MMC Category 1).	Q2 2024 DHLGH
4	Identification and review of a number of internal layouts from the Design Manual for Quality Housing, which readily facilitate adoption for Design & Build, including all forms of MMC.	Q3 2023 DHLGH
5	Research and develop evaluation criteria and suitable metrics that can be used to evaluate tenders for public contracts for housing, to take account of new and emerging MMC approaches to construction (including consideration of the pre-manufactured value, PMV)	Q2 2024 DHLGH
6	Training interventions introduced for public procurers of residential construction to address any MMC knowledge gaps, working with the OGP.	Q4 2023 DHLGH
7	Publish the graduated timetable for mandating BIM in the procurement of projects of different scales and types.	In place OGP
8	MMC data dashboard developed and launched as part of the Data Insights Platform.	Q2 2024 DETE
Regulation and Standards		
9	Development of a Continuing Professional Development (CPD) training programme for accreditation, to address identified skills gaps in Modern Methods of Construction (MMC) for construction sector professionals.	Q4 2023 DHLGH
10	Training interventions commenced for Building Control Authorities (BCAs), which would include training on relevant standards and certification processes, to address any MMC knowledge gaps.	Q4 2023 DHLGH
11	Strengthened capacity within the NSAI to support an efficient Agrément process.	Q2 2023 NSAI
12	Assessment of the efficiency of current Agrément Certification process in an international comparative context.	Q3 2023 NSAI
13	Communication about NSAI Agrément Certification and Inspection in the context of the broader regulatory system for residential construction.	Q3 2023 NSAI
14	Stakeholder engagement and contribution to related international and European standards developments, and consultation on specific national needs, if any, and progress as appropriate.	Ongoing NSAI
15	Inter-Departmental & Industry Working Group on Timber in Construction established.	Q3 2023 DAFM

16	Preparation of structures to account for embodied carbon in construction materials for buildings in advance of draft Energy Performance of Buildings Directive (EPBD) requirement of 1 st January 2027	Q4 2026	DHLGH/ SEAI
Capital, Finance, and Insurance			
17	Encouragement to the MMC sector to apply for the Growth and Sustainability Loan Scheme and the Ukraine Credit Guarantee Scheme	Q3 2023	DETE
Modern Methods of Construction Skills Development			
18	Consolidation of information on MMC courses currently available and made available on the SOLAS website.	Q3 2023	SOLAS
19	EGFSN report on the skills requirement for the transition to MMC published.	Q4 2023	EGFSN
20	Action Plan in response to the EGFSN report on MMC Skills published	Q2 2024	DFHERIS
21	Establishment of the National Demonstration Park for MMC with Phase 1 Units installed.	Q1 2024	SOLAS
22	Commence delivery of Phase 2 of the National Demonstration Park for MMC.	Q4 2024	SOLAS
Industry Competitiveness and Capacity			
23	Effectiveness of Built to Innovate assessed (including feedback from industry) and offering adapted as appropriate.	Q2 2024	DETE
24	Targeted leadership development training for the residential construction sector to strengthen company leadership, change management and financial management capabilities, with input from Enterprise Ireland	Ongoing	Skillnet and Enterprise Ireland
25	<i>Construct Innovate</i> complete Accelerated Housing Applied Research, Dissemination and Demonstration Programme (AHARDD) Fund research projects and publish results.	Q4 2023	Construct Innovate
Effective Policy Execution and Communication			
26	The MMC Leadership and Integration Group overseeing implementation and further development of this Roadmap for MMC in Public Housing Delivery, informed by engagement with domestic and international stakeholders, and will continue to meet monthly with DHLGH continuing to coordinate the delivery of MMC through Housing delivery bodies.	Q2 2024	DETE & DHLGH
27	MMC Collaborate to Innovate stakeholder events convened annually.	Annually	DETE & DHLGH
28	Publication of an information booklet on MMC that will provide plain English guidance on MMC definitions and benefits.	Q3 2023	DHLGH with MMC LIG

Introduction

Housing for All

Housing for All – A New Housing Plan for Ireland is the Government’s multi-annual, multi-billion-euro plan to improve Ireland’s housing system and to ensure that every citizen in the State has access to good quality homes.

Under *Housing for All*, the Government is aiming to deliver an average of at least 33,000 new homes annually from 2021 to 2030, including an average of 10,000 social homes and 6,000 affordable homes for purchase or for rent across Local Authorities (LAs), the National Development Finance Agency (NDFA), Approved Housing Bodies (AHBs), the Land Development Agency (LDA) and the First Home Scheme. The table below sets out details of targets for social and affordable housing delivery in the period 2022-2030.

Table 1. Social and Affordable Housing Delivery, 2023-2030

	2023	2024	2025	2026	2027	2028	2029	2030
Social Housing	9,100	9,300	10,000	10,200	10,200	10,200	10,200	10,200
Affordable Housing	5,500	6,400	6,400	6,100	6,300	6,400	6,300	6,300

While *Housing for All* currently plans for significantly increased annual delivery to around 40,000 by 2030, as capacity grows in the construction sector, housing supply targets will be reviewed in light of Census 2022. The review will have regard to unmet demand in recent years (arising from under supply in the past); population growth (including from inward migration); and updated assumptions regarding household sizes (smaller households meaning more housing). Work has commenced in this regard and will inform national and local housing targets, as well as subsets of social, affordable and private housing, and ensure enough of the right types of homes in the right place are provided. Work will continue up to the end of 2023, with any revisions to targets finalised thereafter.

As these homes will be built by the Irish construction sector, it is crucial that all elements of the sector required to bring the delivery of a home from its inception to completion have the capacity to deliver in an efficient, compliant, and sustainable manner. While it is understood that some elements of the sector may have sufficient or excess capacity, the scaling up of the use of MMC for public housing will only be achieved through an integrated approach which sees all inter-connected

elements of the construction, manufacturing, civil engineering and professional services gearing up to provide the expertise and capacity necessary to deliver on an ambitious programme.

A key mechanism to increase construction sector capacity identified in *Housing for All* is to increase innovation and productivity, including more widespread deployment of Modern Methods of Construction (MMC).

Modern Methods of Construction

MMC is an umbrella term used to describe a range of innovative construction processes, including offsite construction techniques, such as mass production and factory assembly (further details set out in Box 1).

The reported benefits of MMC are significant. MMC is estimated to deliver a 20 to 60 percent reduction in construction programme time; a 20 to 40 percent reduction in construction costs; a 70 percent plus reduction in onsite labour, which creates improved outcomes in health and safety for workers; reduced embodied carbon in construction, and greater programme certainty [cited in EY research for Enterprise Ireland on '*A Detailed Description of Needs for the Irish Construction/ Built Environment Sector*' published in 2021]. The construction programme benefits are reliant on highly effective design coordination, planning and scheduling.

Some of these benefits, such as reductions in construction programme time, have already been demonstrated in an Irish context. Other reported benefits, in particular cost savings on the scale suggested, have yet to be consistently realised in Ireland. It is expected that with higher degrees of standardisation and repeatability, and at larger scales, significant cost efficiencies from MMC can be achieved. These benefits align with the national policy objectives set out in *Housing for All*, the Climate Action Plan, the National Development Plan, the Whole of Government Circular Economy Strategy, and the Waste Action Plan for a Circular Economy. They will also assist in placing Ireland's residential construction sector on an economically, socially, and environmentally sustainable footing and support the achievement of the residential building Sectoral Emissions target of a 40 percent reduction by 2030.

One final consideration when seeking to promote MMC is that different MMC technologies are at different levels of maturity. For example, panelised systems (MMC Category 2, especially timber-frame systems) are already well established in the Irish market. The best available data¹ suggests that 48 percent of scheme homes is delivered through timber-frame, and several Light Gauge Steel

¹ Irish Timber Frame Manufactures Association ([here](#))

Frame (LGSF) systems are already on the Irish market. In contrast, volumetric systems (MMC Category 1, 3D volumetric) in residential construction are at an earlier stage of maturity in the provision of residential accommodation. The goal of increasing capacity, and certainty for industry, remains the same.

Box 1 - Modern Methods of Construction

In recent decades, more productive and innovative construction has been reflected in increased deployment of Modern Methods of Construction (MMC), the established terminology used to describe a range of innovative construction processes, including off-site construction techniques such as mass production and factory assembly. MMC has the potential to help boost onsite productivity, increase efficiency and environmental sustainability in housing delivery.

Factory-based offsite construction methods are not new, and there were surges in the use of pre-fabricated housing solutions previously, with mixed results. More recently, the advent of digitalisation and the environmental sustainability imperative are promoting continued evolution of the construction sector to deliver quality housing.

In a residential context, reflecting the UK's MMC definitional framework and the forthcoming publication *'What are MMC? An Introductory Guide to Modern Methods of Construction'*, MMC can be categorised as follows:

1. Pre-Manufacturing – 3D primary structural systems
2. Pre-Manufacturing – 2D primary structural systems
3. Pre-Manufacturing – non-systemised structural components
4. Pre-Manufacturing – additive manufacturing
5. Pre-Manufacturing – non-structural assemblies and sub-assemblies
6. Traditional building product led site labour reduction/productivity improvements
7. Site process led labour reduction/productivity improvements

MMC represents a significant transformation in construction, incorporating increased levels of offsite manufacturing and assembly; new technologies, products and building systems; and increased digitalisation. And innovation is continuing at pace. Wider adoption across a diversity of MMC types is demanding ecosystem-wide adjustment. Fully realising the benefits of MMC approaches in housing delivery is dependent on overcoming the challenges presented by the scope of the adjustment required.

Under *Housing for All*, a range of initiatives are already underway to support innovation and enhanced productivity in housing delivery, including MMC approaches. These include:

- the establishment of the **Construct Innovate Technology Centre** led by University of Galway that will support industry-led research, development and innovation in construction products and processes, with residential construction prioritised.
- the rollout of **'Built to Innovate'** by Enterprise Ireland which extends innovation and business transformation supports to the domestic residential construction sector.
- the forthcoming establishment of a national **Demonstration Park for MMC**, led by Solas and Laois-Offaly ETB at the national construction skills training centre at Mount Lucas that will enable exploration, demonstration and better understanding and awareness of the latest MMC technologies and offsite building systems; and
- the **Build Digital** Project at TU Dublin that will support the sector in digital adoption and the deployment of Building Information Modelling.

The Department of Enterprise, Trade and Employment has established a cross-Departmental and cross-agency MMC Leadership and Integration Group to ensure that these and other emerging initiatives are undertaken in a coordinated way, and to identify further ways to encourage and enable construction sector innovation and productivity improvements.

The role of Public Procurement in accelerating transformation

This Roadmap for the increased adoption of MMC in public housing delivery reflects the role that public procurement can make in leading system transformation. As a major procurer of construction services, the State has a significant presence in the market. The social and affordable housing delivery targets in *Housing for All* will account for a significant portion of the demand pipeline for residential construction services over the next decade. In recognising the opportunity that increased deployment of MMC presents, public procurement can have a key role in increasing demand for innovative approaches to enhance delivery and accelerating the necessary ecosystem-wide enablers, including the commensurate strengthening of expertise on the part of contracting authorities. This benefits not only public housing delivery but impacts the sector in its entirety.

Local authorities already have experience in delivering homes through MMC, with a number of social housing projects using a variety of MMC building systems. Current examples of successful delivery programmes using Design and Build forms of procurement include Wicklow County Council's framework which is delivering housing schemes in Light Gauge Steel Frame, Timber Frame, and Insulated Concrete Formwork. There have also been national programmes to deliver modular housing as an emergency response to house refugees from Ukraine. Challenges which arose on those projects, and the solutions which were implemented, have informed the development of this Roadmap, and will inform future procurement of housing using MMC.

An important policy objective in *Housing for All* is to support the development of new build housing. LAs and AHBs are being supported to develop their capacity to deliver new build schemes. While LAs, AHBs and the LDA transition to a higher proportion of delivery coming from ‘direct build’², this will be supplemented by delivery of social and affordable homes through the ‘turnkey’³ delivery model. A significant number of these projects are delivered using MMC technology and as the construction ecosystem is further supported to increase MMC deployment, this in turn will support the increased adoption of MMC systems in ‘turnkey’ projects.

Thematic Areas

Drawing on the lessons from past experiences; ongoing stakeholder engagement; the recent MMC publications produced by the Construction Industry Federation (CIF) for the Construction Sector Group Digital Adoption and Innovation Sub-Group^{4,5}; the Royal Institute of Architects of Ireland’s (RIAI) Design for Manufacturing and Assembly guidance documents⁷; and other publications (including a Detailed Description of Needs analysis for the construction sector commissioned by Enterprise Ireland); the Department of Enterprise, Trade and Employment and the Department of Housing, Local Government and Heritage (working through the MMC Leadership and Integration Group) have identified the following areas as crucial to the more widespread adoption of a range of MMC types in the residential construction sector:

- 1. Development and further roll out of procurement approaches to enable MMC** (how the design and execution of public procurement can achieve desired objectives in relation to public housing delivery using compliant MMC, including design standardisation requirements).
- 2. Regulation and Standards** (including the regulatory and certification journey time and costs associated with the introduction of new innovative systems, and skilled up monitoring, site supervision, and inspection regime for MMC, all of which are key to the success of procuring innovative building solutions).

² Housing units that are funded, designed, and constructed with the public body as the client. There are other forms, such as the PPP model, where the homes are also maintained for a 25-year period on behalf of the public body as client.

³ Turnkey acquisitions are housing units that are purchased (or leased) from the private sector or another public body once design and construction is completed.

⁴ CIF ‘MMC Quantitative Analysis and Definition Framework Document’ (unpublished)

⁵ CIF ‘Modern Methods of Construction Report’

⁶ Skillnet ‘Modern Methods of Construction – Defining MMC Business: Construction Professionals

⁷ RIAI ‘Design for Manufacturing and Assembly/ DfMA Report’

3. **Capital, Finance, and Insurance** (addressing barriers to access to finance for investment that would result in increased MMC capacity in Ireland).
4. **MMC Skills Development** (encouraging the skills transformation required within the sector and the availability of the necessary skillsets).
5. **Industry Competitiveness and Capacity** (including manufacturing capability, Research, Development and Innovation, and knowledge transfer to the industry and related professions).
6. **Effective Policy Execution and Communication** (including effective collaboration between policymakers and the construction sector and building awareness and understanding about the benefits and opportunity of MMC amongst the industry, public sector, and public).

Approached from a public procurement perspective, the remainder of this document deals with each of these thematic areas in turn, setting out a series of milestones that the Government is committed to delivering to ensure that the productivity, efficiency, and sustainability benefits associated with MMC can be realised, and that there is increased confidence in the industry to scale up investment and increase MMC delivery capacity.

1. Development and further rollout of procurement approaches to enable Modern Methods of Construction

Under *Housing for All*, there is a target to deliver over 144,000 new build social, affordable, and cost rental homes between 2022 and 2030, which will be delivered by Local Authorities (LAs), the National Development Finance Agency (NDFA), Approved Housing Bodies (AHBs), and the Land Development Agency (LDA). Several public funding sources will be used, and the delivery will include direct builds⁸ and turnkey acquisitions⁹ with a number of procurement approaches.

Local Authorities

Under *Housing for All 2022* Action 4.3, DHLGH has introduced initiatives to enable a significant increase in public housing delivered using MMC. LAs have been advised that DHLGH is supportive of a Design & Build delivery approach, which facilitates the increased use of MMC, and LAs are encouraged to adopt a Design & Build approach where appropriate.

In December 2022, €94 million funding was approved to address LA legacy land debt contingent on the LA committing to the early development of housing projects utilising MMC that would commence construction in 2023 or 2024.

A total of 26 sites received funding and with some additional sites, the Department is now working to progress delivery of MMC projects on approximately 30 sites. For the period to the end of 2024, at least 1,500 houses are expected to be commenced under the Accelerated Social Housing Delivery Programme.

A number of social housing projects have previously been delivered using several MMC building systems. These projects vary in scale and complexity consisting of a range of house and apartment typologies and utilising a range of MMC elements. There are currently c. 3,000 units in the social housing pipeline for Design & Build MMC delivery. This includes those being delivered under the Accelerated Social Housing Delivery Programme.

⁸ Housing units that are funded, designed, and constructed with the public body as the client. There are other forms, such as the PPP model, where the homes are also maintained for a 25-year period on behalf of the public body as client.

⁹ Turnkey acquisitions are housing units that are purchased (or leased) from the private sector or another public body once design and construction is completed.

Approved Housing Bodies

AHBs also procure public housing. To date, they have delivered a significant amount of their housing stock through turnkey projects. It is likely that some have been constructed using MMC, but firm data is not currently available. DHLGH is committed to supporting the AHB sector to increase the proportion of delivery through construction projects. A number of actions are being taken to support this objective, including the provision of increased resources in the Housing Agency to support AHB construction and the introduction of measures to support AHB access to land.

Land Development Agency

The LDA supports and encourages the use of MMC in the delivery of affordable housing. Panelised systems such as timber frame and pre-cast concrete are being used on current projects as well as prefabricated components. The LDA continues to explore the deployment of MMC solutions on all its schemes while balancing the need to deliver affordable homes with supporting construction innovation, and ensuring competitive tension at a tender stage – that is critical to achieve value for money.

National Development Finance Agency

The Social Housing Public-Private Partnership (PPP) programme, which is being procured by the NDFA, has used various forms of MMC in Bundles 1 and 2 of the programme (including the extensive use of timber frame and insulated concrete formwork). The design, specification and procurement approach for future bundles are being developed to further enable the use of MMC technologies.

Student Accommodation

Through *Housing for All*, the Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) has been tasked with developing policy and methodology for potential long-term State support for the construction of Purpose-Built Student Accommodation (PBSA) to provide additionality for targeted cohorts. DFHERIS recognises the role MMC can play in the delivery of PBSA, and the importance of design standardisation to achieve greater efficiencies in construction, though a one-size-fits-all approach may not be suitable across all locations. To this end, DFHERIS are working with DHLGH to develop designs and specifications that will facilitate the procurement of MMC.

1.1 Design and Build Procurement Approach

The Design and Build contract is available for public works contracts since the publication of the Capital Works Management Framework in 2007. The use of the Design and Build form of Public Works contract encourages increased innovation and the use of MMC in the delivery of social housing¹⁰. While Design and Build contracts are used by LAs, many still favour the Employer Design form as this is a more familiar 'tried and trusted' form where the prospective employing party wants to have a more active role in the eventual outcome of the project than a standard Design and Build contract would normally offer. DHLGH will continue to work with LAs to maximise delivery through the Design & Build form of contract.

In March 2023, the Housing Agency published a guide to the use of the public works contract for building works designed by the contractor (Design and Build contracts)¹¹. The guide is aimed at those who are working with, or advising LA and AHBs, who have a working knowledge and experience of procurement of consultants and Design and Build contractors using the Capital Works Management Framework. It is intended that the guide will enable accelerated delivery of housing by LAs and AHBs who are engaging in construction projects, and be a key source of information about all the procurement options available within the Capital Works Management Framework for enabling Design and Build.

A significant number of social homes has been delivered utilising a Design & Build approach, and there is an emerging level of expertise in this area across the LA sector. A central ambition of the Accelerated Social Housing Delivery Programme is to further expand this expertise across the sector.

DHLGH have collaborated with the Local Government Management Agency (LGMA), the Housing Agency and the Office of Government Procurement (OGP) towards agreement on a procurement approach for the Accelerated Social Housing Delivery Programme. Projects under this programme will utilise Design and Build contracts, with a significant focus on programme delivery time as part of the tender assessment process (which should encourage the adoption of MMC).

Milestone 1. Continue the expanded use of a Design & Build procurement approach as an initial step to enable greater use of MMC in social and affordable housing delivery and undertake briefing events for industry to support participation in procurement competitions.

Timeline: Underway

Owner: DHLGH/ LAs/ AHBs

¹⁰ See *Guide for use of PW-CF2 Public Works Contract for Building Works Designed by the Contractor* Link [here](#)

¹¹ *Ibid*

1.2 Procurement Supports

As housing procurers engage with MMC in a more substantive way through the Social Housing Accelerated Delivery Programme, it is expected that common issues will arise, and common solutions may be applicable. It is anticipated that this knowledge will be captured and shared in a systematic way, with a central co-ordinator to develop 'best practice' guidance for procurers.

Milestone 2. Appoint a project management team to coordinate Local Authority MMC procurement best practice.

Timeline: In place

Owner: DHLGH

1.3 Emerging Procurement Approaches

Where social housing projects have been delivered using a Design and Build approach, the forms of MMC implemented, were in the main, 2D panelised systems. To facilitate wider adoption of other forms of MMC (including 3D volumetric systems), and building on the recent experience of the Office of Public Works (OPW) on the development of modular systems for refugee accommodation, further consideration with regard to appropriate procurement approaches will be required, taking into account the more innovative building systems involved. To this end, a number of pilot projects will be identified, following wider sectoral and industry engagement. This initiative will build on existing expertise and develop procurement approaches to best support other forms of MMC. Learnings from this initiative will inform further rollout of these approaches.

Milestone 3. Initiate a pilot project to deliver social, or affordable, housing using a 3D volumetric system (MMC Category 1).

Timeline: Tender process commencing in Q2 2024

Owner: DHLGH

1.4 Design standardisation

A key consideration and challenge in the scale up of MMC relative to traditional construction is design standardisation. MMC processes, like an assembly line, work most efficiently where the final product is standardised. This allows for repeatability along the assembly line, creating efficiencies.

While this standardisation of the final product is taken for granted in the manufacturing sector (e.g., automobiles, etc.), it is not commonplace in the construction sector. This means that the productivity and cost reduction benefits of learning-by-doing, and economies of scale are lost as manufacturers are unable to take a risk on pre-manufacture.

Design for Manufacturing and Assembly (DFMA)

DfMA is a term originating from the world of manufacturing, where it emphasises two practical design considerations – how a component is manufactured, and how it will be assembled into a product – that together have the potential to improve the efficiency of production.

The term originally applied to factory-made, mass-produced components that would be assembled into larger mass-produced products destined for an end-user, all in a factory.

With advances in manufacturing techniques, it now commonly applies to making products that can be tailored to varying degrees in a process known as mass customisation. As well as giving consumers more choice, being able to mass customise has widened the relevance of DfMA to include the design of all buildings from complex to small scale.

Increasingly considerations about whole-life cost of buildings bring additional dimensions to the design process including building maintenance, disassembly, and re-use of construction materials. These approaches make use of intelligent and smart (monitored and controllable) components

The more widespread adoption of ‘design-build’ contracts will facilitate the integration of DfMA as the design and construction phases of a construction project are carried out by the same entity meaning that it is much easier to incorporate manufacturing and assembly requirements at the design stage.

Further information about DFMA and related concepts can be found in [RIAI Design for Manufacture and Assembly](#), October 2022; and *DfMA Overlay to the RIBA Plan of Work, Mainstreaming Design for Manufacture and Assembly in Construction* 2nd Edition, 2021

There is a particular challenge here in the context of social housing delivery. For example, currently LA housing schemes rarely exceed 60 units, and standardisation of design is minimal across the sector. The recently published [Residential Construction Costs Study](#) commissioned by DHLGH has recommended the greater use of standardisation in residential construction. Two of these recommendations are particularly important for MMC: (i) to develop standardised residential construction designs and specifications in consultation with industry; and (ii) to develop a standard for State-funded purpose-built student accommodation. These actions are being taken forward by DHLGH and provide an opportunity to increase design standardisation and suitability of design for MMC.

In 2022, DHLGH published the *Design Manual for Quality Housing*¹², which seeks to provide guidance on the design of Social Housing developments in respect of site layouts and the internal layouts of individual dwellings. It is principally addressed to LA and AHBs and their consultants. The Manual seeks to promote a consistent approach nationally in respect of design priorities and space standards.

Standardising designs for use by Local Authorities, AHBs, LDA and NDFA, which are suitable for different tenures such as Social, Affordable and Cost Rental, will be supported. A selection of designs in the Design Manual are being reviewed to facilitate ease of adoption for Design and Build, including all forms of MMC. A balance must be struck to ensure that standardised designs are efficient, as well as flexible for use with different types of construction systems.

A careful selection of a small number of standardised designs can provide opportunities to develop mixed unit types to meet a diverse range of household sizes and should not limit opportunities for a varied external appearance. These standard designs will be available for use by all providers of social housing.

The Sustainable and Compact Settlement Guidelines are currently being prepared and regard will need to be taken of these in the preparation of future standardised designs.

Milestone 4. Identify and review a number of internal layouts from the Design Manual for Quality Housing, which readily facilitate adoption for Design and Build, including all forms of MMC.

Timeline: Q3 2023

Owner: DHLGH

1.5 Procurement criteria and metrics for evaluation of MMC in public housing delivery

Procurement evaluation criteria may need to be refined in line with the development and increasing sophistication of MMC manufacturing to ensure that innovation is supported and encouraged, achieving value for money as required under the Public Spending Code, while also allowing for as wide a participation by the construction sector as possible. To support this, consideration will need to be given to suitable metrics that adequately reflect the impact of MMC approaches on delivery, including consideration of the pre-manufactured value (PMV) measure.

¹² [gov.ie](http://www.gov.ie) - Design Manual for Quality Housing (www.gov.ie)

Milestone 5. Research and develop evaluation criteria and suitable metrics that can be used to evaluate tenders for public contracts for housing, to take account of new and emerging MMC approaches to construction (incl. consideration of the pre-manufactured value, PMV measure).

Timeline: Q2 2024

Owner: DHLGH

1.6 Procurement Best Practice – Training Interventions

To address any knowledge gaps, training must be rolled out at scale to Irish housing procurers to ensure that the public system is aware of the differences that MMC introduces to the procurement process.

Milestone 6. Introduce training interventions for public procurers of residential construction to address any MMC knowledge gaps, working with the OGP¹³.

Timeline: Q4 2023

Owner: DHLGH

1.7 Procurement and Digitalisation

Digital is a key enabler of off-site construction solutions; it allows project teams to identify opportunities, to collaborate with providers on solutions and to manage interfaces and scheduling requirements. Digital platforms are essential to fully realise the productivity and sustainability gains realisable through MMC. The Office of Government Procurement (OGP), in collaboration with the Build Digital Project are preparing a range of supports such as template documents and guidance material for clients to enable them to procure their projects in accordance with Building Information Management (BIM) standards. BIM requirements will be introduced into the Capital Works Management Framework on a phased basis commencing with design teams on large public works projects until, over a period of 4 years, they will be required on all public works projects.

Milestone 7. Publish the graduated timetable for mandating BIM in the procurement of projects of different scales and types¹⁴.

Timeline: In place¹⁵

Owner: DPER

¹³ HfA Update Action 13.7

¹⁴ HfA Update Action 13.5

¹⁵ Announced 4th July 2023 – see <https://constructionprocurement.gov.ie/bim-requirements-in-the-cwmf-from-january-2024/>

1.8 Better data

The Department of Enterprise, Trade and Employment (DETE) is commissioning research and analysis that will create a ‘dashboard’ of metrics to benchmark and track levels of MMC adoption and related trends in productivity performance in the residential construction sector in Ireland.

The output from the study will enable the Department to create a baseline assessment of the level of MMC adoption in the Irish residential construction sector and a range of metrics that can continue to inform ongoing policy implementation in the area of MMC adoption and construction innovation.

Through ongoing deliberations of the MMC Leadership and Integration Group (LIG), it is clear that while there is a reasonably clear understanding of what MMC is, there is a paucity of data that can reliably inform as to the current levels of MMC deployment in the Irish built environment, the rate at which the sector is transforming in this respect, or the actual impact of MMC on construction sector productivity.

It is intended that the metrics developed, and data collected for the MMC dashboard will form a part of the *Housing for All* Data Insights Service (a cross-Departmental project being led by Department of the Taoiseach and DHLGH).

DHLGH’S ‘Project Dion’ will identify MMC use in housing delivery through the Local Authorities from 2024.

Milestone 8. Develop and launch an MMC data dashboard as part of the Data Insights Platform.¹⁶

Timeline: Q2 2024

Owner: DETE

¹⁶ HfA Update Action 13.12

2. Regulations and Standards

2.1 Building Regulations and Building Control

In Ireland, the design and construction of buildings is regulated under the Building Control Acts 1990 to 2014, in order to ensure the safety of people within the built environment. The Acts provide for the making of Building Regulations and Building Control Regulations.

Building Regulations

The Building Regulations set the legal requirements for the construction of new buildings and works. The aim of the Building Regulations is to provide for the safety and welfare of people in, and about, buildings. They are expressed in terms of functional requirements for the relevant aspects of design and construction that a building must achieve. As a set of performance and functional requirements, the Building Regulations do not set limitations on materials or processes. There are 12 parts, classified as Parts A to M.

Technical Guidance Documents (TGDs) are published to accompany each part of the Building Regulations, indicating how the requirements of that part can be achieved in practice for non-complex, common buildings.

The TGDs provide prescriptive guidance at a greater level of technical detail and refer to established standards for traditional construction techniques on what is required to achieve compliance with the Building Regulations. Where works are carried out in accordance with the relevant technical guidance, such works are considered to be, *prima facie*, in compliance with the relevant regulations.

Part D (Material and Workmanship) of the Building Regulations sets out an overarching requirement that all works are carried out using **proper materials**, which are fit for the use for which they are intended and for the conditions in which they are to be used. It further notes that proper materials include materials which: (a) bear a CE marking in accordance with the provision of the Construction Products Regulation; (b) comply with an appropriate Harmonised European Standards (hEN) or European Technical Assessment (ETA) in accordance with the provision of the Construction Products Regulation; or (c) comply with an appropriate Irish Standard or Irish Agrément Certificate or with an alternative national technical specification of any EEA country, which provides in use an equivalent level of safety and suitability.

The primary responsibility for compliance with the Building Regulations rests with the designers, builders, and owners of buildings.

The Building Regulations, and the TGDs, evolve over time to reflect advances in the construction sector, with all amendments the subject of public consultations. To ensure that Government can draw on independent expert advice in this context, DHLGH are re-establishing the Building Regulations Advisory Body (BRAB). The membership of BRAB will be appointed on an independent basis to represent areas of expertise and experience, relevant to building regulations.

Building Control

The Building Control Regulations (BCR) establish procedures, administration and control to secure implementation of, and compliance with, the performance requirements of Building Regulations.

Enforcement of the Building Regulations is carried out by the 31 local Building Control Authorities (BCAs), who have extensive powers of inspection and enforcement under the Building Control Acts, and who are independent in the use of their statutory powers.

In general, when constructing a building, extending, or carrying out works to an existing building, the Building Control Regulations require that the owner assigns competent persons to design, build, inspect, and certify the building works. In turn, these persons must account for their role through the lodgement of compliance documentation, inspection plans and statutory certificates.

The various roles and responsibilities of owners, designers, builders, assigned certifiers, etc. during building works are set out in the *Code of Practice for Inspecting and Certifying Building and Works*.

2.2 Competence

Building Regulations require that all works should be carried out by competent persons with sufficient training, experience, and knowledge appropriate to the nature of the work they are required to perform and having regard to the size and complexity of such works so as to ensure a proper standard of workmanship.

While there are high levels of familiarity with certain categories of MMC (e.g. timber frame, and pre-cast concrete), designers, builders and certifiers need to be competent in the use of the latest MMC developments to ensure safe, suitable, and compliant implementation. Along with personnel in BCAs, these actors are generally more familiar with standard or traditional methods of construction, and what must be demonstrated to comply with the Building Regulations. The adoption of new and emerging construction technologies requires upskilling to develop competence.

Milestone 9. Working through the MMC Leadership and Integration Group and in conjunction with the relevant professional bodies and education providers, develop a Continuing Professional Development (CPD) training programme for accreditation, to address identified skills gaps in Modern Methods of Construction (MMC) for construction sector professionals¹⁷.

Timeline: Q4 2023

Owner: DHLGH

Milestone 10. Introduce training interventions for Building Control Authorities (BCAs), which would include training on relevant standards and certification processes, to address any MMC knowledge gaps¹⁸.

Timeline: Q4 2023

Owner: DHLGH

To ensure a proper standard of workmanship as required by the building regulations, it is essential that persons are competent, possessing sufficient training, experience and knowledge appropriate to the nature of the work they are required to perform and having particular regard to the size and complexity of such works. For new and emerging MMC building systems, builders, installers and erectors may require skills different in nature to traditional construction, including training on storing materials, assembly, construction details, and protection during construction. While schemes are already in existence, the development of new training and auditing schemes for builders, installers, and erectors, of proprietary systems of MMC to demonstrate competence in line with the requirements set out in the Building Regulations will need to be considered.

2.3 Agrément Certification

The Agrément process is designed specifically for new innovative building materials, products and systems that do not yet have a long history of use and for which there may be no national standard, harmonised European product standard (hEN) or European Technical Assessment (ETA). The assessment is carried out by an independent third party, such as NSAI Agrément.

The NSAI Agrément Certificate establishes proof that the certified products are ‘proper materials’ suitable for their intended use under Irish site conditions, and in accordance with the Building Regulations, and when installed in line with the Certificate, are compliant with the Building Regulations. The NSAI develops a Technical Assessment Specification (TAS), that sets out the

¹⁷ HfA 2022 Update Action 13.9

¹⁸ HfA 2022 Update Action 13.8

technical criteria for the assessment and testing of the system, which can include laboratory test results, on-site evaluations, and on-site inspection plans. The TAS is developed with reference to the Irish Building Regulations and the TGDs.

Given its central role in facilitating the wider deployment and evolution of MMC systems in Ireland, it is crucial that the Agrément process is as efficient as possible. *Housing for All* (2022) Action 13.11 includes an action to enhance the Agrément process.

NSAI has already published a guide to the Agrément process for MMC and now offers certification at the construction stage, and sign-off on MMC installation onsite¹⁹. This will improve residential construction product assessment processes, including expanding the current NSAI Agrément approach, to ease certification of new building methods, the introduction of sustainable construction materials, and oversight of on-site installation.

To support the delivery of Action 13.11, NSAI has commenced an internal restructuring of its Construction Division with associated recruitment of dedicated staff, supported by *Housing for All* implementation funding. The new structure creates separate 'Agrément' and 'Inspection' units and has been done in anticipation of increased complexity and further demand for Agrément, and increased NSAI inspection activity.

In addition, to inform further development of Agrément processes, the NSAI will examine the efficiency and efficacy of the current Agrément Certification process in an international comparative context, considering industry experience, an expected scaling up of demand, efficient access to relevant testing, and increased complexity of 'building systems'.

Finally, it is important that there is clarity for the industry and wider stakeholders as to the role of NSAI Agrément Certification and Inspection functions in the context of the broader regulatory system for residential construction.

Milestone 11. Strengthen capacity within the NSAI to support an efficient Agrément process.

Timeline: Q2 2023

Owner: NSAI

¹⁹ https://www.nsaie.ie/images/uploads/certification-agreement/Guide_to_Agr%C3%A9ment_Certification_for_MMC.pdf

Milestone 12. Assess the efficiency of the current Agrément Certification process in an international comparative context.

Timeline: Q3 2023

Owner: NSAI

Milestone 13. Drive understanding (and communicating) about NSAI Agrément Certification and Inspection in the context of the broader regulatory system for residential construction.

Timeline: Q3 2023

Owner: NSAI

2.4 Irish Standards for MMC

The development of new standards can play an important part in driving construction innovation by setting higher performance parameters for products and systems. They create a common framework for innovation. Standards set the framework by defining common vocabularies, establishing the essential characteristics of a product or service, and by identifying the best practice that will ensure successful outcomes. Standards also facilitate the development of training programmes.

NSAI has established a committee to advise in relation to Standards for off-site construction which includes MMC, and to monitor work at an international level, which includes an ISO committee looking at prefabricated buildings (led by China) and the work that the UK Government recently commissioned, directing BSI to develop a publicly available specification for MMC. Nationally, this committee will continue to engage with, and facilitate, industry in identifying and addressing any gaps in Standards related to MMC.

Milestone 14. Through the NSAI standards development process, facilitate stakeholder engagement and contribution to related international and European standards developments, and consultation on specific national needs, if any, and progress as appropriate.

Timeline: Ongoing

Owner: NSAI

2.5 Collaborative Dialogue

It is important for industry and Government have a forum to engage in the context of emerging new innovations. The Construction Sector Group (CSG) and its Innovation and Digital Adoption sub-group provide useful platforms for dialogue in relation to innovation, productivity, environmental sustainability, and regulations.

For issues specific to the use of timber in construction, the Department of Agriculture, Food and Marine (DAFM) is establishing an Interdepartmental & Industry Working Group on Timber in Construction with the objective of creating the conditions to increase the use of timber in construction, including innovative timber products, while ensuring the highest degree of building safety and property protection. The Group's work will include examination of regulatory considerations, Standards and Certification processes, and proposals to maximise the use of home-grown timber products in construction.

Milestone 15. Establish an Inter-Departmental & Industry Working Group on Timber in Construction

Timeline: Q3 2023

Owner: DAFM

2.6 Embodied carbon in the Built Environment

Embodied Carbon in construction materials makes a significant contribution to the lifetime carbon emissions of new buildings. These embodied carbon emissions are being addressed by the Climate Action Plan, the review of the EU Construction Products Regulation and the review of the Energy Performance of Buildings Directive (EPBD).

In accordance with the proposed EPBD, DHLGH is engaging with the Sustainable Energy Authority of Ireland to put in place embodied carbon frameworks for the 1st of January 2027 for new buildings over 2,000 metre squared and for new residential buildings from the 1st January 2030. This declaration of Global Warming Potential will be included in the Building Energy Rating Certificate. There is significant work required to establish certified material databases, an accounting framework for embodied carbon, development of software, and training of assessors. The EPBD is planned to be adopted by the European Institutions later this year.

In addition, the Whole of Government Circular Economy Roadmap commits to increased use of offsite design and manufacture in the construction sectoral roadmap.

Modern Methods of Construction is a key initiative to improve the sustainability of housing.

Milestone 16. Prepare structures to account for embodied carbon in construction materials for buildings in advance of draft EPBD requirement of 1st Jan 2027

Timeline: Q4 2026

Owner: DHLGH/ SEAI

3. Capital, Finance, and Insurance

3.1 Financing of MMC based construction and supply

The financing model for the MMC sector is different from traditional construction companies. Relative to traditional construction companies, offsite manufacturers are required to make substantial upfront investments in their fixed assets (such as a factory, equipment, testing and certification, product liability (especially for 3D volumetric systems), and intangible assets like human capital and designs. Several high-profile business failures among 3D volumetric manufacturers in the UK underlines the importance of building resilient business models in this sector, and there are potential learnings that can be garnered from these experiences.

It is important to ensure that SMEs, including microenterprises, can access appropriate and affordable finance suitable to their stage of development. While it remains the responsibility of the banking system to provide the credit to businesses, Government (working with agencies, the banking sector, and alternative finance providers) offers additional targeted supports where there are market failures. A wide range of supports is available for companies at all stages of their life-cycle – from start-ups and early-stage companies to those seeking to scale and grow.

The most relevant scheme from an MMC perspective is the forthcoming **Growth and Sustainability Loan Scheme (GSL)**. This is a new long-term loan guarantee scheme that will make competitively priced loans of between €25,000 and €3million available to SMEs for terms of up to 10 years, with loans of up to €500,000 available unsecured. It is planned that the GSL will be launched in the market in the coming months.

When implemented, the GSL will make up to €500m in longer-term lending available to SMEs. Up to 70 percent of lending will be for strategic investments with a view to increasing productivity and competitiveness, and thus underpinning future business sustainability and growth. The GSL will also target a minimum of 30 percent of the lending volume towards environmental sustainability purposes.

While finance of pure real estate development activity is not an eligible activity in the GSL, businesses may avail of the GSL for eligible strategic investment purposes.

The **Ukraine Credit Guarantee Scheme (UCGS)** was launched in January 2023 and provides low-cost loans (€10,000 to €250,000) for working capital and medium-term investment, especially in energy saving measures, to SMEs, primary producers, and small mid-caps (businesses with fewer than 500

employees). The same restriction on pure real estate development activity is also in place for the UCGS.

Milestone 17. Encourage the MMC sector to apply for the Growth and Sustainability Loan Scheme and the Ukraine Credit Guarantee Scheme.

Timeline: Q3 2023

Owner: DETE

Under the Public Works Contracts, payment for materials or components that are manufactured offsite is possible with bonds put in place in favour of the Contracting Authority in the event of an insolvency or breach on the part of the main contractor or the supplier. This improves the cash flow situation to MMC fabricators and is widely used where lifts are to be incorporated into a building. MMC companies also tend to require greater levels of working capital as they incur costs earlier in the construction process, and receive payments later, which means that they need to have sources of funding to cover this period. Given this type of financing is only required when an MMC company has a clear pipeline of projects to deliver, with contracts in place, the private sector should be well equipped to provide financing in this situation. DETE, through the MMC Leadership and Integration Group, will continue to monitor this situation and act if a clear gap is identified.

3.2 Insuring MMC

From a commercial insurance perspective (e.g. product liability, public and employer liability, contingent business interruption), any adoption of new processes presents alternative risk profiles to consider.

In the UK, there is some evidence to suggest that insurance may have been a potential barrier to more widespread MMC adoption, with one industry publication²⁰ noting that projects incorporating MMC have been more challenging to insure, which has resulted in the UK insurance industry adopting a cautious, conservative approach to underwriting projects utilising modern methods.

In an Irish context, the RIAI²¹ note that premium increases or underwriting refusals may arise if the insurance industry is not made aware of the changes in risk resulting from MMC use within business practices (for commercial coverage) and buildings (for personal and commercial property insurance).

²⁰ [The insurability of modern methods of construction \(marsh.com\)](#)

²¹ [RIAI DFMA Report 2022 v5 04Oct22.pdf](#)

Consequently, there is value in keeping the insurance (and reinsurance) industry abreast of novel MMC applications throughout the innovation cycle in Ireland. DETE has engaged with the insurance industry on this point. If issues emerge that require a public policy response, DETE (through the MMC Leadership and Integration Group) will work with the appropriate stakeholders to examine potential policy options.

4. Modern Methods of Construction Skills Development

A sufficient supply of labour is key to a well-functioning construction sector.

In many developed countries, there is a significant issue in attracting and maintaining a construction workforce. Compounding the issue is the relatively high average age of a construction worker and, given the physically taxing nature of the work, there is likely to be a wave of retirements that could greatly disrupt the delivery potential of the sector.

Ireland has a robust system for delivering the skills required in the construction sector. The *'Report on the Analysis of Skills for Residential Construction and Retrofitting 2023-2030'*, commissioned by SOLAS (Ireland's Further Education and Training Authority) and DFHERIS, quantified the additional construction skills required to deliver the Government's targets for new housing and the retrofitting of 440,000 homes over the period 2023-2030.

The report focuses on all construction skills – that is, skills which correspond to every qualification level on the Irish National Framework of Qualifications (NFQ). In general, the education and training of persons in levels 1-6 inclusive is funded by SOLAS and delivered by sixteen Education and Training Boards (ETBs). Higher education institutes provide for education and training relating predominantly to qualifications above level 6 (with some level 6 provision as well).

The report concludes that to deliver the Government's targets in housing and retrofitting, and to continue to engage in general repair and maintenance, it is estimated that just over 50,000 new entrants will have to be recruited in managerial, professional, skilled, and semi-skilled occupations over the period 2023-2030. These new entrants may be a combination of workers currently employed in the industry who are seeking to upskill, or jobseekers who wish to pursue a career in building or retrofitting.

This study makes no assumption around the level of adoption of MMC, which can potentially dramatically alter the skills mix required by the Irish construction sector. The skills projections are being reviewed regularly to ensure their continued relevance to practices in the sector and such reviews are including consideration of MMC developments.

4.1 Developing MMC skills

In April 2022, the Construction Professionals Skillnet, a network that aims to support the development and growth of construction businesses by working with them to identify and address their skills needs and by providing specific training and development solutions, published *Modern Methods of Construction: Defining MMC Business*. This report sets out the new construction sector business model necessary for the effective implementation of MMC and the related new roles and skills required to perform effectively.

Following the publication of this report, the Construction Professional Skillnet (in collaboration with Skillnet Ireland and Griffith College) have launched a new micro-credential in *Strategic Co-ordination and Collaboration for Modern Methods of Construction*.

This is the first of a number of micro-credentials being developed by the Construction Professional Skillnet and covers project-critical areas such as project management with design freeze, commercial relationships and structures, and how to create a collaborative culture. Other programmes in development include a micro-credential for procurement and finance areas relating to MMC activities, which will take account of the new social housing procurement framework for MMC being developed by DHLGH.

The Laois-Offaly Education and Training Board (LOETB), in conjunction with the National Construction Training Campus located in Mount Lucas, is also making a significant commitment to increase capacity to deliver MMC skills. LOETB is on track to deliver phase 1 of the National Demonstration Park for MMC by early 2024 and are upgrading their facilities to provide MMC training. This initiative is discussed in further detail below.

These are significant developments in terms of provision currently available, and it is likely that further skills offerings are available through private providers. It is important to collect the information on the current MMC skills offering in one place with reference to best practice and avoiding unnecessary overlaps.

Milestone 18. Consolidate information on MMC courses currently available and make this material available on the SOLAS website.

Timeline: Q3 2023

Owner: SOLAS

4.2 Identifying and quantifying future MMC Skills needs

In parallel, further research is needed to ensure that a comprehensive Government response to delivering the MMC skills that are anticipated to be required is in place. Consequently, the Expert Group on Future Skills Needs (EGFSN), working with the MMC Leadership and Integration Group, have commissioned a report on the future skills needs, assuming a dramatic increase in MMC.

When this report is finalised, DFHERIS will work with all relevant partners to develop an Action Plan to implement the recommendations, to be overseen by the MMC Leadership and Integration Group.

Milestone 19. Publish the EGFSN report on the skills requirement for the transition to MMC

Timeline: Q4 2023

Owner: Expert Group on Future Skills Needs

Milestone 20. Publish an Action Plan in response to the EGFSN report on MMC Skills

Timeline: Q2 2024

Owner: DFHERIS

4.3 MMC Demonstration and experimentation

The National Demonstration Park for MMC will be an accessible and interactive built resource for MMC demonstration, applied research and training, located at the National Construction Training Campus, at Mount Lucas, Co. Offaly. Ultimately, the Demonstration Park will operate under the Laois-Offaly Education and Training Board (LOETB).

The objectives of the Demonstration Park include:

- To provide an accessible 'flagship' location for MMC demonstration in Ireland, and in so doing to facilitate the showcasing of innovative MMC products and systems, particularly for the housing sector;
- To raise awareness, and to disseminate the knowledge and understanding of MMC innovation throughout Ireland by way of such a showcased facility;
- To build a national network around MMC of manufacturers, contractors, clients, designers, and policymakers, and to support and contribute to related activities through this network; and
- To identify and provide applicable specialist training for emerging MMC skillset requirements.

It is intended that the Park will have an agile model, capable of facilitating experimentation and proof of concept activities, as well as established MMC operational processes. The Park will make use of supporting facilities to accommodate administration, visitors, education/training, and demonstration of processes. Industry and interested groups will then be able to visit the Park to view and interact with the MMC technologies and approaches on display. Collaboration facilities for industry engagement will also be provided as part of the Demonstration Park.

Phase one will see a number of residential units developed, including an apartment building, terraced houses, semi-detached houses, social housing, and a volumetric modular unit. Subsequent phases will include additional dwellings demonstrating different MMC technologies and covering the full complement of MMC categories, a visitor centre and other supporting facilities.

Milestone 21. Establish the National Demonstration Park for MMC with Phase 1 Units installed.

Timeline: Q1 2024

Owner: SOLAS

Milestone 22. Commence delivery of Phase 2 of the National Demonstration Park for MMC.

Timeline Q4 2024

Owner: SOLAS

5. Industry Competitiveness and Capacity

Across the economy, innovation-driven companies are delivering solutions to national and global challenges and opportunities in many areas. The ambition of our national enterprise policy is to consolidate and build on the progress that has been made and redouble efforts to broaden and deepen innovation capability across the enterprise sector, in particular, the innovation performance of SMEs, embedding a culture of continuous innovation. This is particularly relevant to the construction sector, where the continuing evolution of technologies and offsite processes is having a disruptive impact on a scale previously unseen, on the industry itself, and the nature and performance of the buildings and infrastructures it delivers.

The successful implementation of this Roadmap depends on the industry responding to this transformation challenge. The policy levers in this space are concentrated around leadership and management training, driving increased productivity and sustainability, and promoting investment and collaboration in research, development, and innovation.

Currently, the construction sector represents 2.1 percent of GDP or 4.6 percent of Modified Domestic Demand²² and employs roughly 161,000 people²³, in c.62,000 firms²⁴ – the vast majority SMEs. Productivity data suggests that labour productivity in the Irish construction sector (at €33/hour) is in the middle-of-the-pack in a European context. It is ahead of Spain, Portugal, and Italy, but lags behind Denmark, Austria, Belgium, Germany, Netherlands, Finland, and France²⁵.

There is little available information specifically on MMC businesses in Ireland, but overall adoption across the Irish construction sector appears to be low²⁶. Research by Ernst and Young (EY) suggests that seven percent of firms regarded MMC as their main activity. Of these firms, panelised systems, sub-assemblies, and hybrid systems (which combine volumetric and panelised systems) are the most common.

NSAI data on companies who have secured Agrément or the IS440 standard for timber-frame for their MMC products and systems, shows that there are 44 companies with certified MMC systems at date of this publication. The data also suggests that panelised systems (MMC Category 2) and insulating concrete formwork (MMC Category 5) are the most common technologies deployed.

²² CSO Quarterly National Accounts, [Q1 2023 \(prov\)](#)

²³ CSO Labour Force Survey, [Q1 2023](#)

²⁴ CSO Structural Business Statistics [2020](#)

²⁵ Build Report 2022, Construction Sector Performance and Capacity ([here](#))

²⁶ EY Detailed Description of Needs report commissioned for Enterprise Ireland

Table 2. NSAI Agrément and IS440 certifications by MMC category and technology, May 2023

MMC Category	Technology	Companies (with Agrément or IS440)
Volumetric	Volumetric	1
Panelised	Timber frame	27
	Light Gauge Steel Frame	8
	Insulating Concrete Formwork	1
Pre-manufactured components	Timber	1
Non-structural Assemblies	Insulating Concrete Formwork	6
Total		44

However, the industry recognises the transformative impact that MMC will have on the sector, with 86 percent of large firms in the EY research highlighting the importance of MMC to the future of the industry. The construction sector is becoming more offsite and industrialised, more internationalised, more consolidated, and there will be opportunities as well as challenges for established and new players. This transformation is not without its risks, as recent developments for MMC firms in the UK construction industry have brought into sharp focus. It is vital that Ireland’s construction industry can embrace the opportunities and deliver the benefits offered by MMC with resilient business models.

This will require the sector to perform at the cutting edge of technology and innovation, operational excellence, compliance, financial acumen, and with an ability to execute delivery at world class levels of speed and efficiency. For manufacturing, in simple terms, greater capacity can be achieved through the recruitment of additional staff and the deployment of more or newer advanced manufacturing equipment. The industry in Ireland has demonstrated its ability to rapidly increase capacity with projects such as the modular accommodation for Ukrainian refugees. Timber frame companies have also grown their output rapidly in the past three years to reach 48 percent of scheme houses²⁷.

A commonly cited issue for manufacturing companies who may be seeking to increase their capacity is the market demand risk. At present manufacturers may doubt that there will continue to be a consistent, predictable demand into the medium and longer term. This can introduce caution into business decisions such as equipment purchases, some of which may have a lead time for delivery of 12-24 months.

²⁷ Irish Timber Frame Manufacturers Association survey cited in [Timber Frame – Irish Timber Frame Manufacturers Association - \(constructionnews.ie\)](https://www.constructionnews.ie)

5.1 Building firm-level capacity, capability and productivity

Through the Enterprise Ireland 'Built to Innovate' programme, domestic homebuilders, and domestic-facing MMC manufacturers, can now avail of lean and digital grants, and funding for in-house research and innovation projects.

In its first year of operation Built to Innovate launched a series of Lean, Digital and Innovation supports to the domestic residential industry. Several exemplar projects were delivered with companies such as Clancy Construction and Cygnum. Overall, there was a strong take up of supports, particularly from manufacturers of offsite systems such as timber frame. The supports delivered to date have varied in scale. Smaller, scoping type supports such as the Digital Discovery Voucher or a Lean Start have been used to benchmark where businesses are at and develop plans for larger projects. The larger projects are typically a mix of both digital and lean systems implementation. They can involve systems development, training, and external consultancy support. The focus of the innovation supports delivered has been largely around the optimisation of offsite systems through design and added value in factory settings.

Projects supported under Built to Innovate often have complementary sustainability aims. Lean projects and Operational Excellence (lean and digital combined) have a strong focus on waste reduction in enterprises. The implementation of MMC and adding greater levels of Pre Manufactured Value (PMV) are part of the Built to Innovate strategy and could be supported by potential innovation funding. Increasing the use of MMC in homebuilding can have a significant impact on materials wastage.

In the context of the delivery of the social housing accelerated delivery programme and increased MMC opportunities across the range of social and affordable housing delivery channels, and student accommodation provision, Enterprise Ireland can assist with building supply chain awareness through, for example, stakeholder engagement and meet-the-buyer type events.

Milestone 23. Assess effectiveness of Built to Innovate (including feedback from industry) and adapt offering, as appropriate.

Timeline: Q2 2024

Owner: DETE

5.2 Strengthening business leadership and management capability

Evidence suggests that gains from digitalisation are not spread evenly across firms. Those firms with better managers and better organisational skills benefit disproportionately from digital adoption.

More broadly, the construction sector will need a generation of highly trained leaders with the skills and experience to navigate the transformation of the sector and to take advantage of the opportunities that the disruption affords Irish businesses. Skillnet Ireland and Enterprise Ireland have a range of leadership and management training programmes in which construction sector businesses can participate.

While uptake of such courses has to date been low, further courses are planned, covering areas such as project management with design freeze, commercial relationships, and structures, and how to create a collaborative culture. For example, a construction specific 'Transform Your Business' programme is now available. 'Transform Your Business' provides targeted supports to help SMEs across Ireland sustain and improve their business.

Milestone 24. Delivery of targeted leadership development training for the residential construction sector to continue; focusing on strengthening company leadership, change management and financial management capabilities, with input from Enterprise Ireland

Timeline: Ongoing

Owner: Skillnet Ireland and Enterprise Ireland

5.3 Digitalisation

The Government's agenda on construction digitalisation is focused on Building Information Modelling (BIM). BIM is a process for creating and organising digital information about buildings and civil engineering works. One of the key outputs of this process is the information model. BIM extends to the digital description of every element of the built asset. Using a BIM model, project teams can collaborate, share information, and monitor project costs and embodied carbon more effectively.

The Build Digital project, established under Project Ireland 2040, aims to increase the level of digital deployment and innovation in the Irish construction sector. A €2.5 million grant from DPENDR will support the Build Digital project over a five-year period to deliver digital adoption across the entire Irish construction and built environment sector. The project is structured around five pillars of interconnected activities, each of which will work with experts in that area to adapt international and national best practice to transform Irish construction. Supports in the form of tool kits, guidance, exemplars, and templates will be produced by each pillar, with full interoperability and

cognisant of the needs of all stakeholders. These supports are made available openly through the Irish Build Digital Exchange Hub²⁸.

The work of the Build Digital Project will support the industry in building the capacity to meet the requirements of the BIM mandate as set out in **Milestone 7**.

5.4 Research, Development, and Innovation in Construction

One of the most consistently proven methods of improving business competitiveness and productivity is to increase levels of research, development, and innovation (RDI). However, only a small number of construction companies are engaged in R&D activity.

To boost construction sector R&D activity, DETE (with Enterprise Ireland) launched Construct Innovate in 2022. This is a construction specific and industry-led research and development centre, which represents the latest addition to the joint Enterprise Ireland and IDA Technology Centre Programme. To ensure that it delivers for housing, it will be focused on key industry challenges and innovation in residential construction in its first three years of operation. Construct Innovate has initial funding of €5m over 5 years, and is a consortium hosted by University of Galway that also includes Trinity College Dublin, University College Dublin, University College Cork, TU Dublin, and the Irish Green Building Council.

Developing a culture of innovation and research and development in a sector with little history in the space is a challenge. By demonstrating the impact that R&D can have on the construction sector, exposing businesses to the latest advancements in construction technology, and giving them the opportunity to interact with likeminded companies, Construct Innovate will have a potentially transformative impact on the residential construction sector. Progress is being made to develop this culture of innovation. In June 2023, University of Galway (the host organisation of Construct Innovate) launched a new one-year part-time Postgraduate Diploma in Construction Innovation that aims to equip students with the key knowledge and skills needed to develop sustainable technological solutions to the challenges facing the construction and built environment sector in Ireland.

Furthermore, to kickstart research for the residential construction sector, DETE (working with the Department of the Taoiseach) provided an additional €0.5m through the Accelerated Housing Applied Research, Dissemination and Demonstration (AHARDD) Programme Fund 2023.

²⁸ [Build Digital Project](#)

A number of the AHARDD projects have a direct relevance to MMC; including:

- a baseline assessment of overall knowledge and attitudes towards MMC and provide robust information on what more is needed to articulate the benefits of MMC;
- research on how to incorporate the re-use of building materials (Design for Reuse, D4R) into Design for Manufacturing and Assembly (DfMA), a key enabler of MMC, setting out a pathway to ensure DfMA and D4R can be supported in the delivery of housing (including social housing); and
- development of a testbed for envelope solutions testing that will facilitate creation of external cladding solutions for residential buildings and, ultimately, facilitate a move to a greater offsite manufacturing component in panelised systems (especially timber-frame).

Construct Innovate continues to actively engage with industry stakeholders, promoting membership of the Centre and seeking out industry led research challenges. Also, Construct Innovate is regularly engaged with DETE, DHLGH, and Enterprise Ireland in order to identify and prioritise further research projects that would promote the more widespread adoption of MMC in the residential construction sector to support *Housing for All* delivery.

Milestone 25. Construct Innovate to complete research on the AHARDD Fund projects and publish the results.

Timeline: Q4 2023

Owner: Construct Innovate

6. Effective Policy Execution and Communication

6.1 MMC Leadership and Integration Group

To drive further development and greater adoption of MMC in residential construction, DETE has established and chairs (at Assistant Secretary level) a cross-Departmental and cross Agency MMC Leadership and Integration Group. The Group brings together policymakers relevant to the success of the construction sector including on innovation, public procurement, sustainability, housing and the education and skills agenda.

The Group is identifying and progressing actions to accelerate innovation and MMC adoption in residential construction, including this Roadmap for increased adoption of MMC in Public Housing Delivery, and also has a key objective of ensuring that there is an integrated approach across various initiatives and entities with a role in promoting MMC.

The Government's Construction Sector Group operates an Innovation and Digital Adoption Sub-Group, which is driving initiatives more broadly for the construction sector. The Sub-Group is represented on the MMC Leadership and Integration Group and provides an important bridge to a wider range of industry stakeholders, professional bodies, and agencies.

Milestone 26. The MMC Leadership and Integration Group will oversee implementation and further development of this Roadmap for MMC in Public Housing Delivery, informed by engagement with domestic and international stakeholders, and will continue to meet monthly; DHLGH will continue to coordinate the delivery of MMC through housing delivery bodies.

Timeline: Q2 2024

Owner: DETE & DHLGH

6.2 Industry Stakeholder Engagement

In February 2023, DETE hosted the inaugural MMC – 'Collaborate to Innovate' stakeholder engagement event which provided an opportunity for public and private sector stakeholders to collectively consider key industry and policy initiatives and challenges relating to MMC adoption in residential construction.

Milestone 27. Convene further MMC Collaborate to Innovate stakeholder events annually.

Timeline: Annually

Owner: DETE & DHLGH

6.3 Building general awareness and understanding about MMC

The speed of transformation in construction due to MMC approaches can result in a degree of concern and apprehension for many, and indeed may itself present a barrier to the uptake and demand for buildings that have been constructed using innovative methods. Consequently, it is important that there is high quality information available that sets out more detail on MMC.

Milestone 28. Publish an information booklet on MMC that will provide plain English guidance on MMC definitions and benefits.

Timeline: Q3 2023

Owner: DHLGH with MMC LIG



**An Roinn Fiontar,
Trádála agus Fostaíochta**
Department of Enterprise,
Trade and Employment



**An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreacht**
Department of Housing,
Local Government and Heritage

