

CAIRN

Delivering Housing at Scale through Standardisation & MMC

CitA BIM Gathering 2025



Jakub Urbanczyk
Digital Construction Manager



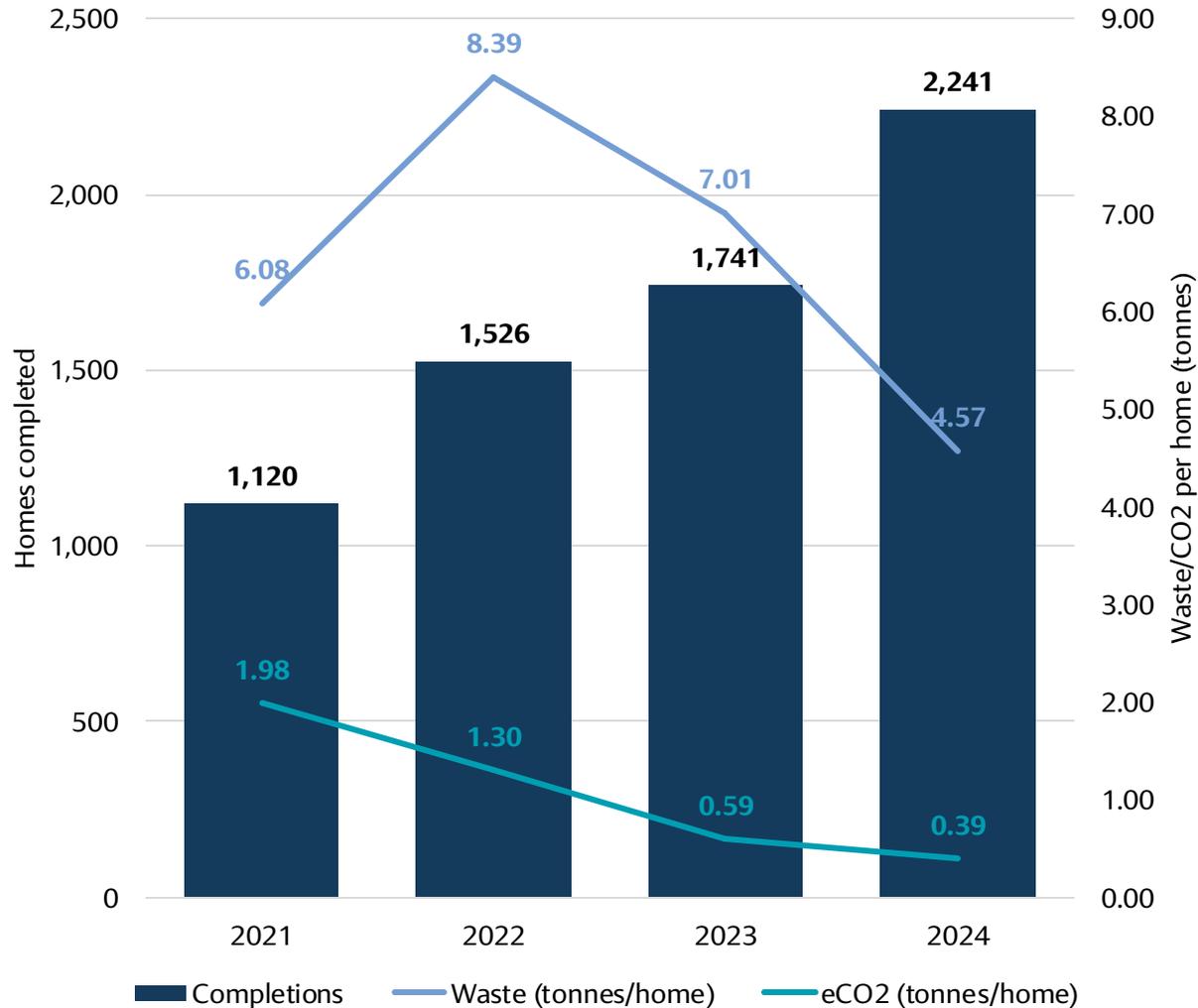
David Smith
Design Manager - Innovation

Built For Good



Cairn's rapid growth

Innovation driving our current trajectory



Completion growth

32%

Compound annual growth rate in completions 2020-2024

Reducing our impact

-74%

Decrease in total CO₂ emissions per sqm residential floor area completed, 2021 to 2024

Leading sustainability

Passive

Over 1,800 apartments under construction to Passive House standard

Research and innovation

15

Number of innovation initiatives being tested at any one time in Cairn's Innovation Test Centre

Efficient by design

25%

Design program saving from our Design Toolkit

Ireland's leading homebuilder

25,000

People living in a Cairn-built home

Cairn Innovation Journey



9 Year Innovation Journey

We are evolving the best way to make housing in Ireland

Evolution not Revolution

Innovation with practical measurable benefits



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Standardisation at Cairn

Header and Footer



Cairn Standardisation – Integrated Process



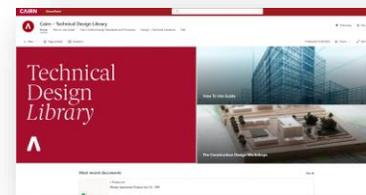
Launched
2022



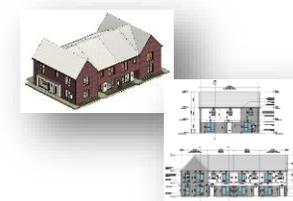
Launched
2022



Launched
2023



Launched
2025



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Standardisation Tool Kit Houses

1

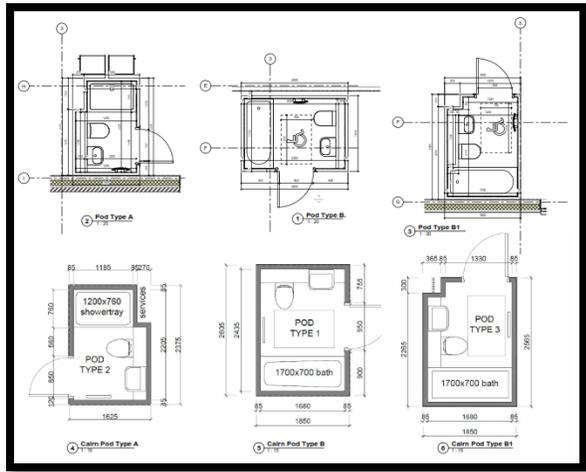
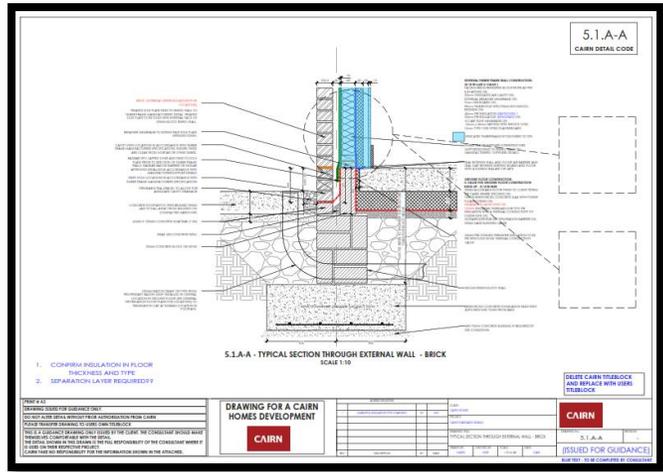
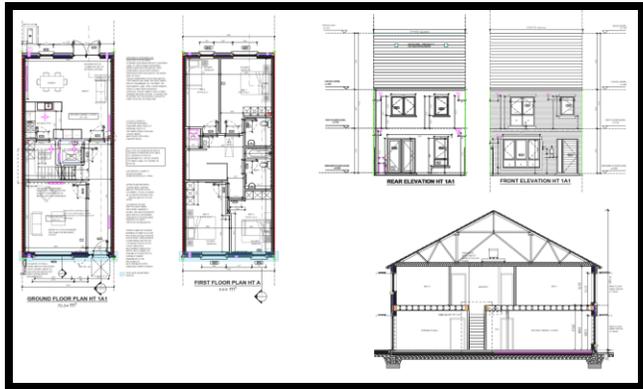
Assemblies (Library of Homes)
Houses
Duplexes
Apartments

2

Construction Detail Library
Suite of Cairn ACDs

3

Component Library
Kitchens, Wardrobes, Stairs, Lobby
Layouts, Pods, Windows, Doors
Assist with Central Procurement



How Cairns Standardisation enables the use of MMC



Cairn Technical Design Library -

Driving Innovation & Efficiency

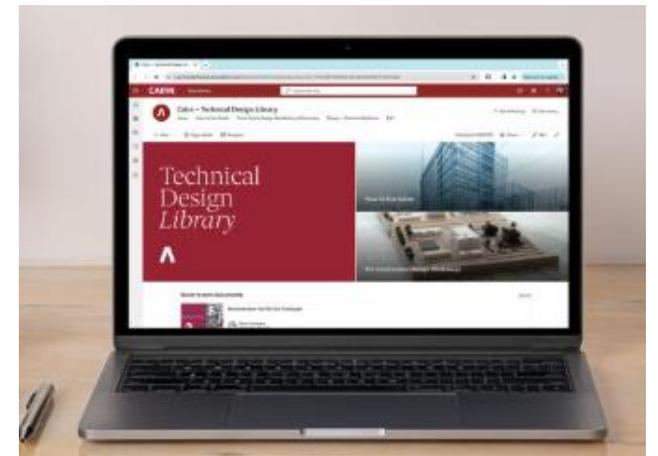
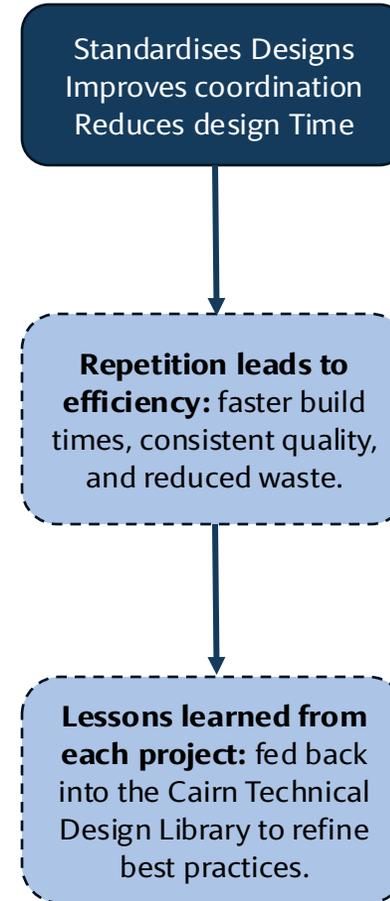
Cairn Technical Design Library allows for -

- **Speed of build**
- **Sustainability benefits**
- **Ease of compliance**
- **Skilled labour efficiency**

Challenges without a structured/standardised design approach :

- Detailing issues
- Compliance concerns
- Numerous errors and omissions
- Costly revisions and mistakes
- Longer construction timelines

Cairn addresses these with the Technical Design Library & Toolkit



Modern Methods of Construction – Categories

1	2	3	4	5	6	7
						
Volumetric modular	Structural panelised	Offsite components	Additive manufacture	Non-structural assemblies and sub-assemblies	On-site building material improvements	On-site process improvement
Offsite and near site pre-manufacturing					Site-based process improvements	

						
Volumetric Buildings Marketing Suite	Timber Frame / LGS Panelised	Pre-Cast double floor Columns + Balconies + Canopies	Slip Form Kerbing	Bathroom Pods / Utility Pods	SFS / EWI Render	Weekly Drone Surveying / BIM

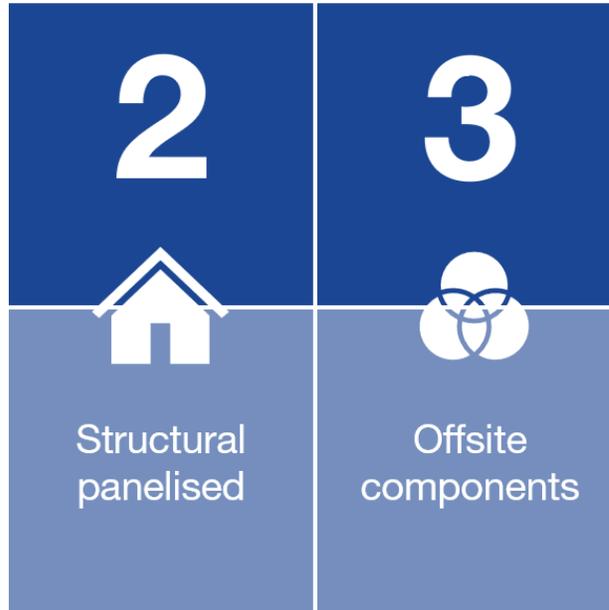
All 7 MMC categories on Show in Cairn Developments

Modern Methods of Construction – Categories



**Timber Frame / LGS
Panelised**

- **Timber Frame Houses**



**Pre-Cast double floor
Columns + Balconies +
Canopies**

- **Standardised Balconies**
- **Standardised Canopies**



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MMC – Offsite Manufacturing

Cairn & Extreme Balconies

Offsite manufacturing



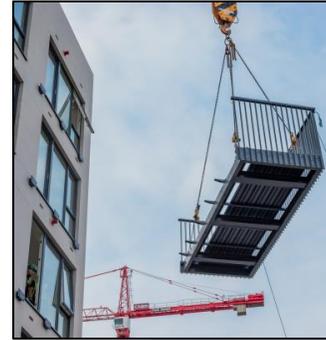
Cairn Technical Design Library - Traditional Balconies vs MMC

Allowed for 52 balconies to be installed in a single day!

Traditional method: Every project had 30-100+ different balcony types. Leading to inefficiencies in **design, production** and **installation**.

With **MMC** and the **Cairn Design Library**, we've shifted to standardised balcony designs, streamlining our entire process. We can now complete large-scale developments with 3-5 balcony types.

- Streamlined Design Process
- Reduced rework and on-site changes
- Standardisation has driven **efficiency, quality, and growth** for Cairn & Extreme.



Traditional method:
Inset balcony with glass balustrading



Traditional method:
Balconies with support posts



Traditional method:
Concrete balconies with balustrading

MMC:

Fully cantilevered balconies with minimal variations.



Benefits:

- Consistent designs across multiple projects.
- Reduced **pricing, design, production, install** costs and timelines significantly. Design cut by 80%.
- **Improved quality control** due to standardisation and enhanced scalability. Allowing robotic welding to be a viable solution.
- Dramatic reduction in on-site hours
- Standard repeatable installs has improved site safety significantly.

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MMC - Timber Frame

Cairn & Fasthouse

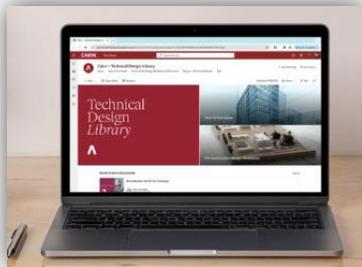
Offsite manufacturing – Structural Panelised



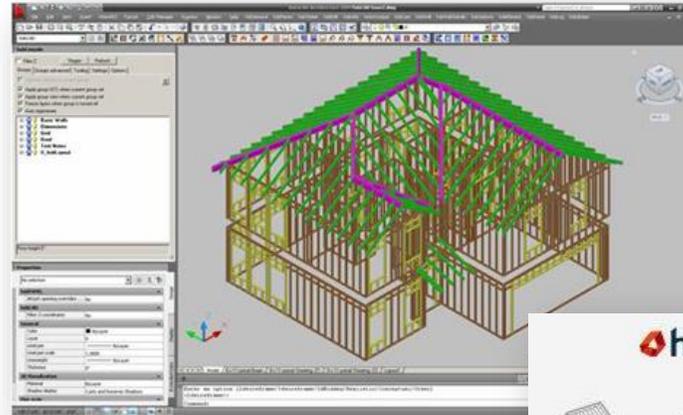
Timber Frame Design Process - Technical Design Libraries impact on process

HSB Autocad Bespoke timberframe design package

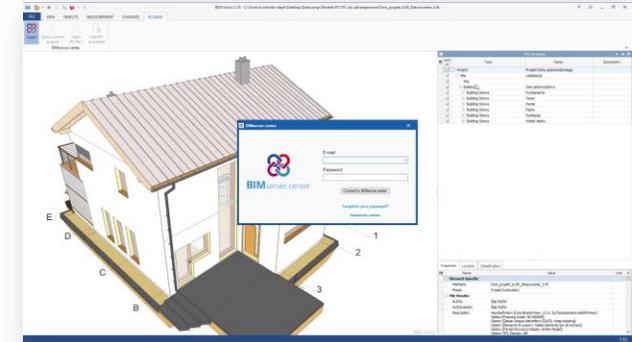
Standardised Drawings



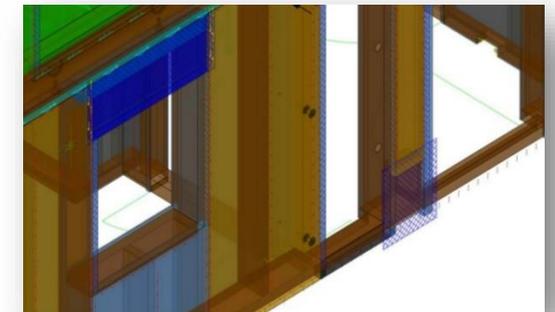
Production Drawings are fully networked to the factory floor, e.g. the automated CNC machines and Nailing Bridges.



Exported to IFC files



IFC files integrated into a BIM Vision



Open 3D in Revit modelling
Full access to turn on and off layers



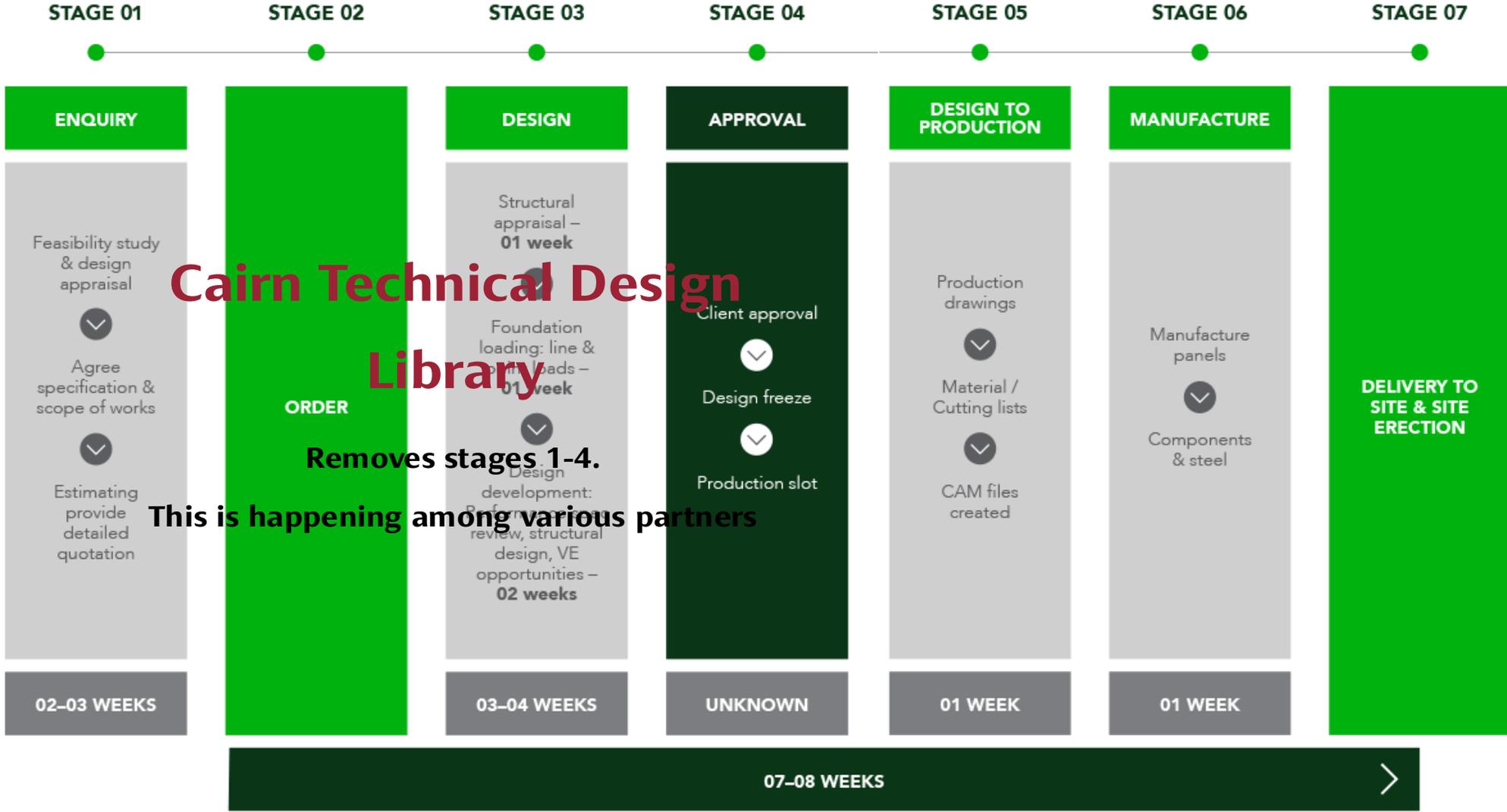
Design to saw: produce cutting lists



Design to frame

Material	Quantity	Unit	Material	Quantity	Unit
Timber	1000	m ³	Roof	500	m ²
Wall	2000	m ²	Floor	1000	m ²
Windows	10	units	Doors	5	units
...

Material lists – accuracy in ordering and waste reductions



Cairn Technical Design Library

Removes stages 1-4.

This is happening among various partners

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MMC – Offsite Manufacturing

Cairn & Baracon

Standardised Canopies

Header and Footer



Offsite Manufacturing - MMC

Prefabricated Canopies

Product - What does it mean to the customer? :

Opportunity :

- Predicted cost is more accurate due to offsite system
- Increased QA and QC of product
- Comes a part of the Standardisation Tool Kit in the Technical Library
- Definitive construction process for the construction programme



Finished Product

Benefits



Construction Timeline Reduced -

RTO Date of unit is earlier due to the sequence of works carried out



Improved Health & Safety -

Less trades and fixings on site resulting in safer, quicker and safer installs.



Product Discount -

Potential to purchase 100+ units in advance of the construction process. Pass the savings on to the customer.



Waste Savings -

Prefabricated units allow for less mistakes and waste on site. Standardised templates also allow for less waste & revisions in the factory.



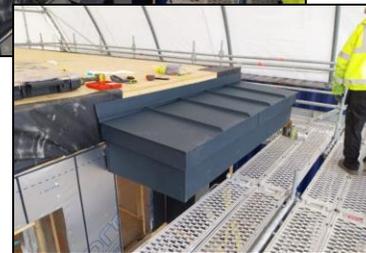
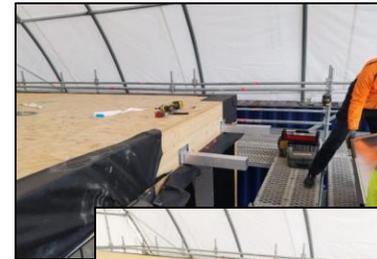
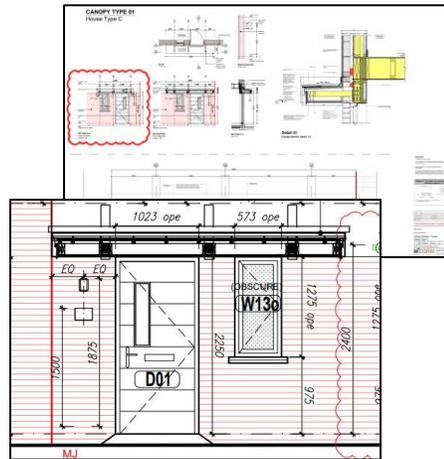
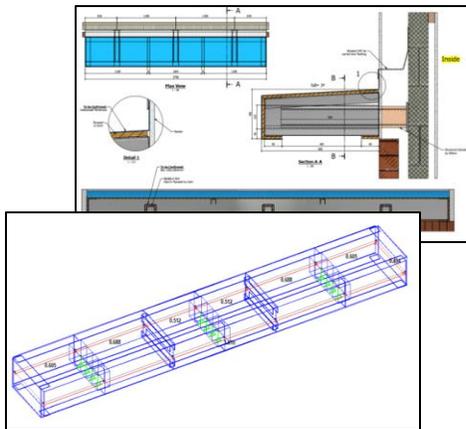
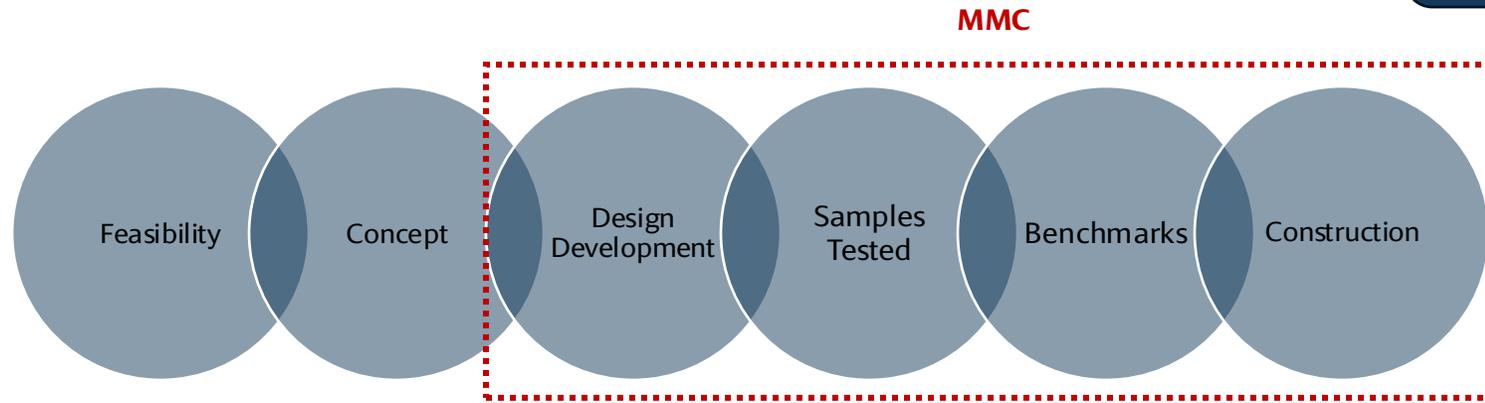
Quality Control -

Standardised prefabricated Construction of the units ensures a consistent quality across all sites. Allowing for the product to be used at scale.

Cairn Technical Design Library - Prefabricated Canopies

Standardises Designs
Improves coordination
Reduces design Time

Technical Design Library



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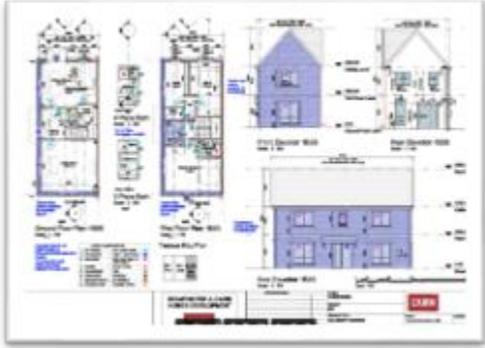
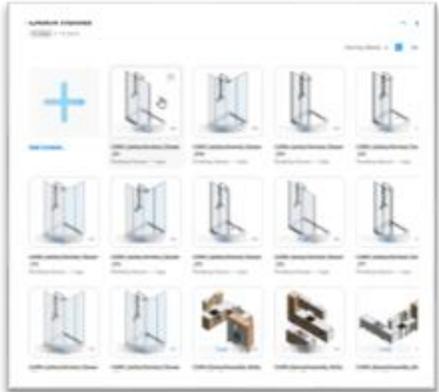
Cairn Standardisation

Digital Design Toolkit

Header and Footer



Digital Toolkit



- 01_CONSTRUCTION STAGE
- GA - General Arrangement
- + 00101 - BLOCK 1- GF PLAN
- + 00102 - BLOCK 1- FF PLAN
- + 00103 - BLOCK 1- RF PLAN
- + 00200 - BLOCK 1- Front/ Side Elevation
- + 00201 - BLOCK 1- Rear/ Side Elevation
- + 00300 - BLOCK 1- Section A-A and B-B
- SH - Schedule
- + 00080 - BLOCK 1- WINDOW SCHEDULE
- + 00081 - BLOCK 1- INTERNAL AND EXTERNAL DOOR SCHEDULES
- ST - Setting Out
- + 00110 - BLOCK 1- GROUND FLOOR REFLECTIVE CEILING PLAN
- + 00111 - BLOCK 1- FIRST FLOOR REFLECTIVE CEILING PLAN
- + 00301 - BLOCK 1- GROUND FLOOR SLAB SETTING OUT
- + 00400 - BLOCK 1- GROUND FLOOR BOARDING & PATTERESSING
- + 00401 - BLOCK 1- FIRST FLOOR BOARDING & PATTERESSING

Standardised Component Library aka Kit of Parts

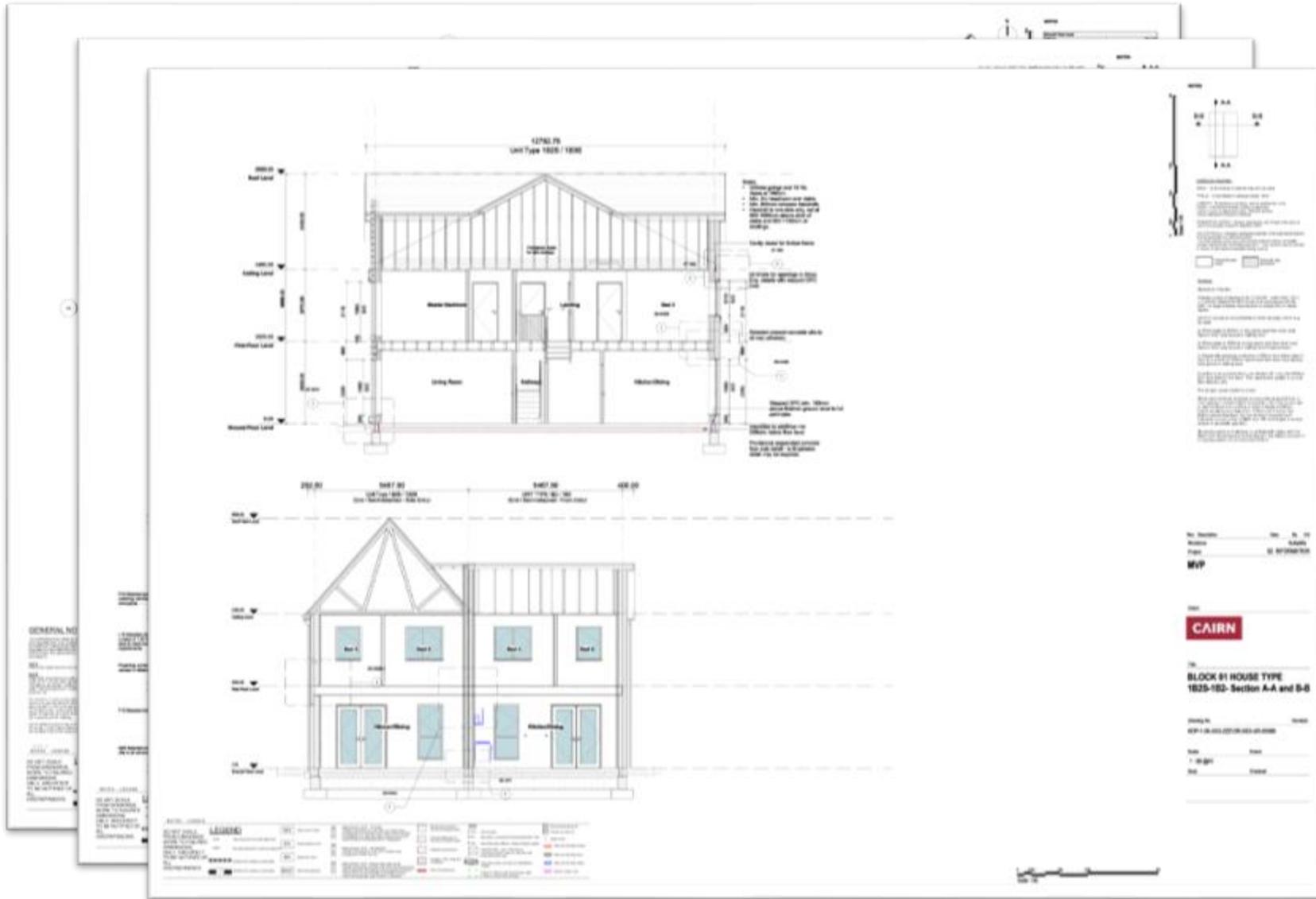
Model and drawing of each house type

Configurator Software

House block model

Standardised Construction Drawings

The image displays a set of architectural drawings, likely a floor plan or site plan, oriented vertically. The main drawing area contains two detailed floor plans of a building, showing room layouts, corridors, and structural elements. The left plan features a prominent red outline, while the right plan shows a more complex layout with red and green highlights. Below the plans is a legend with color-coded boxes and text. To the right of the legend is a north arrow pointing towards the top right. Further right, there are several tables and columns of text, including a table with the heading "ACTION" and another with "CONSTRUCTION". The bottom section of the drawing contains a large block of text, possibly a title block or a list of specifications, and a small logo for "dbb". The entire drawing is presented as a stack of papers, with the top sheet slightly offset to show the underlying layers.



- **Make key decisions early** in the process
- **Limit uncontrolled changes** to design that negatively impact cost and schedule
- **Change only pieces of the puzzle**, rather than reinvent the wheel when designing a house
- **Centralise design governance** and future integration with other business functions
- Ensure **predictability and consistency in quality** of design outputs delivered to site
- Ambition to **integrate BIM model with production line**

Key takeaways

Standardisation is the foundation to using MMC at scale.

Successful innovation is achieved through collaboration with trusted partners.

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Thank You

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