CASTLE GROUP

A MINDSET FOR SUSTAINABLE PARTNERSHIPS

NSAI Agrément
From Certification to Market

NSAI

National Building Control & Market Surveillance Office

Agenda

1. **Castle Group**
    1. Background
    2. From Fit Out to Modular
2. **NSAI Agrément Certificate**
    1. The Journey
    2. System & Structural Strategy
    3. Fire Engineering
    4. Connection Detailing
    5. Certificate Closeout
3. **BCAR**
    1. Roles
    2. Design
    3. Deviations
    4. Factory Processes
    5. Site Supervision
4. **Case Study**
5. **Where next?**

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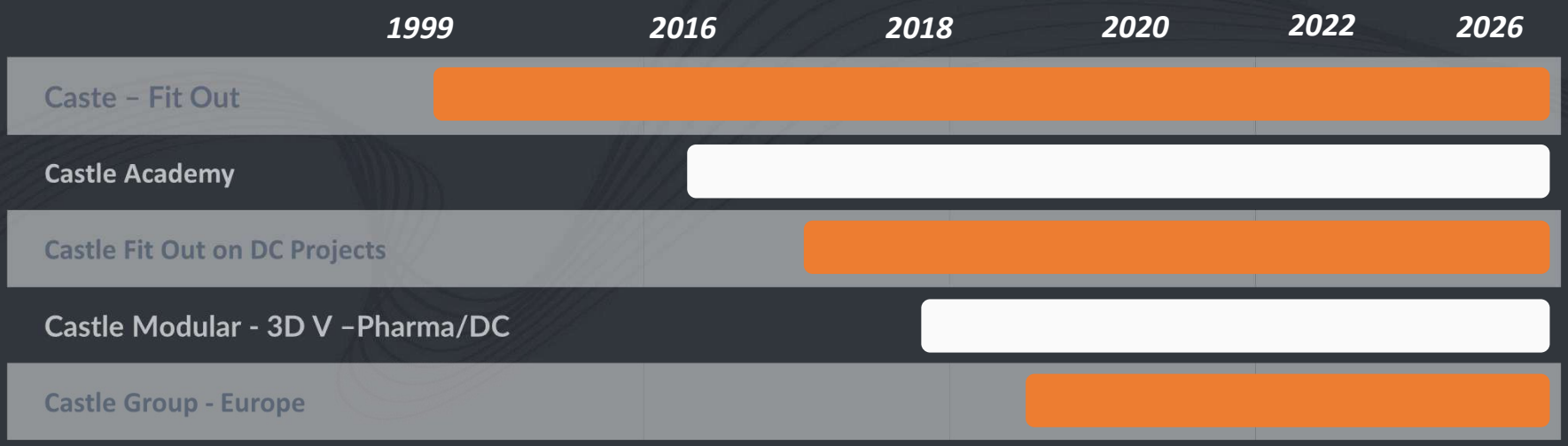
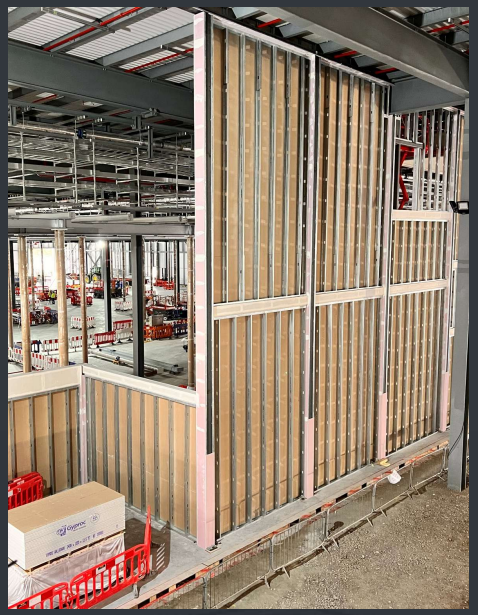
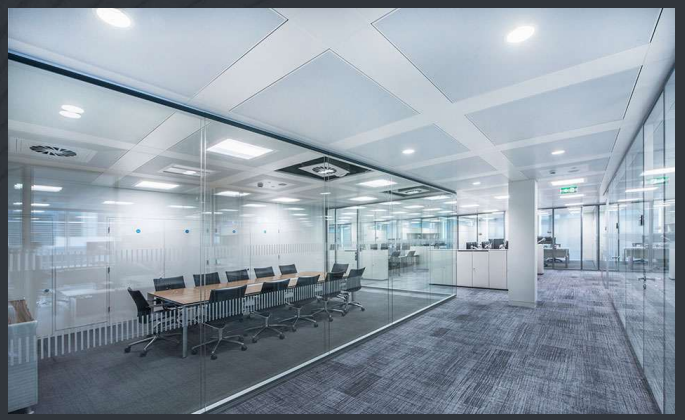
Castle Group

27	350	3 Divisions	70M	Markets
Years	*Employees*	*Modular, Fit Out, Structural Steel*	*Annual Turnover*	*Irl & Europe – Resi, Healthcare, Hospitality, DC, Life Sciences*



From Fit Out to Modular





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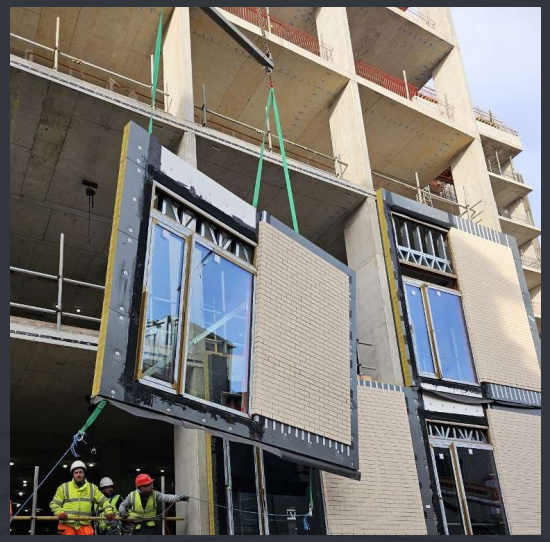
From Fit Out to **Modular**



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NSAI Agrément Certificate

NSAI Agrément

IRISH AGRÉMENT BOARD
CERTIFICATE NO. 26/0449
Castle Group/Castle Modular,
Rahoon,
Gort,
Co. Galway,
H91 KP46
T: +353 (091) 771 823
W: https://castlegroup.ie/

Castle Group Modular Building System

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Assessments.

NSAI Agrément Certificates establish proof that the certified products are **'proper materials'** suitable for their intended use under Irish site conditions, and in accordance with TGD Part D of the second schedule of the **Building Regulations 1997 to 2024.**

SCOPE

This Certificate relates to the Castle Group Modular Building System, for the design, manufacture and erection of volumetric buildings. The Castle Group Modular Building System is a factory manufactured structural building system completed with internal fixtures, fittings and finishes (outside of scope of this Certificate). The system is designed for use in buildings with traditional brick and block outer leaf cladding and roof coverings as per Section 2.1.6 and 2.1.14 of this Certificate. Other cladding systems and roof coverings may be suitable but have not been considered as part of this Certificate.

The Castle Group Modular Building System is certified to be used in the following Purpose Groups 1(a), 1(b) and 1(d) as defined in the Technical Guidance Document (TGD) Part B Fire Safety - Volume 2 – Dwelling Houses (2017) of the Irish Building Regulations and not more than 30m to the top floor of the building in Purpose Groups 1(c), 2(a), 2(b), 3, 4 (a), 5(a), 5(b) as defined in TGD Part B Fire Safety – Volume 1 – Buildings other than Dwelling Houses (2024) of the Irish Building Regulations.

The Castle Group Modular Building System is designed and manufactured by Castle Group. Site erection is carried out by Castle Group or specialist sub-contractors / Main Contractor under the supervision of Castle Group.

In the opinion of NSAI, the Castle Group Modular Building System, as described in this Certificate, complies with the requirements of the Building Regulations 1997 to 2024.

Refer to Section 2 of this Certificate for information on items outside of the scope of this Certification.

Readers are advised to check that this Certificate has not been withdrawn or superseded by a later issue by contacting NSAI Agrément, NSAI, Santry, Dublin 9 or online at http://www.nsai.ie

Certified to be used in

- **Purpose Groups:**
  - 1(a); 1(b) – Small Resi / Dwelling Houses
  - 1(d) - Community Dwelling Houses
  - **TGD Part B - Vol 2 – Dwelling Houses (2017)**

- **Not more than 30m to the top floor of the building in Purpose Groups**
  - 1(c) – High Rise Resi
  - 2(a); 2(b) – Residential Care & Hospital
  - 3 – Hotels, etc.
  - 4 (a) - Offices
  - 5(a); 5(b) – Shop & Commercial
  - **TGD Part B – Vol 1 – Buildings other than Dwelling Houses (2024)**

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NSAI Agrément Certificate – The Journey

NSAI Agrément Gant Chart	2021		2022		2023		2024		2025		2026	
	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
System Strategy					Focus Elsewhere							
Material Selection												
Architectural Concept Design												
Structural Design												
Fire engineering												
Fire Testing												
Acoustic Modelling												
Acoustic Testing												
Connection detailing												
Thermal Modeling												
System Manual												
RAMS												
Queries and responses												
Small Scale Mock Ups												
Certification												

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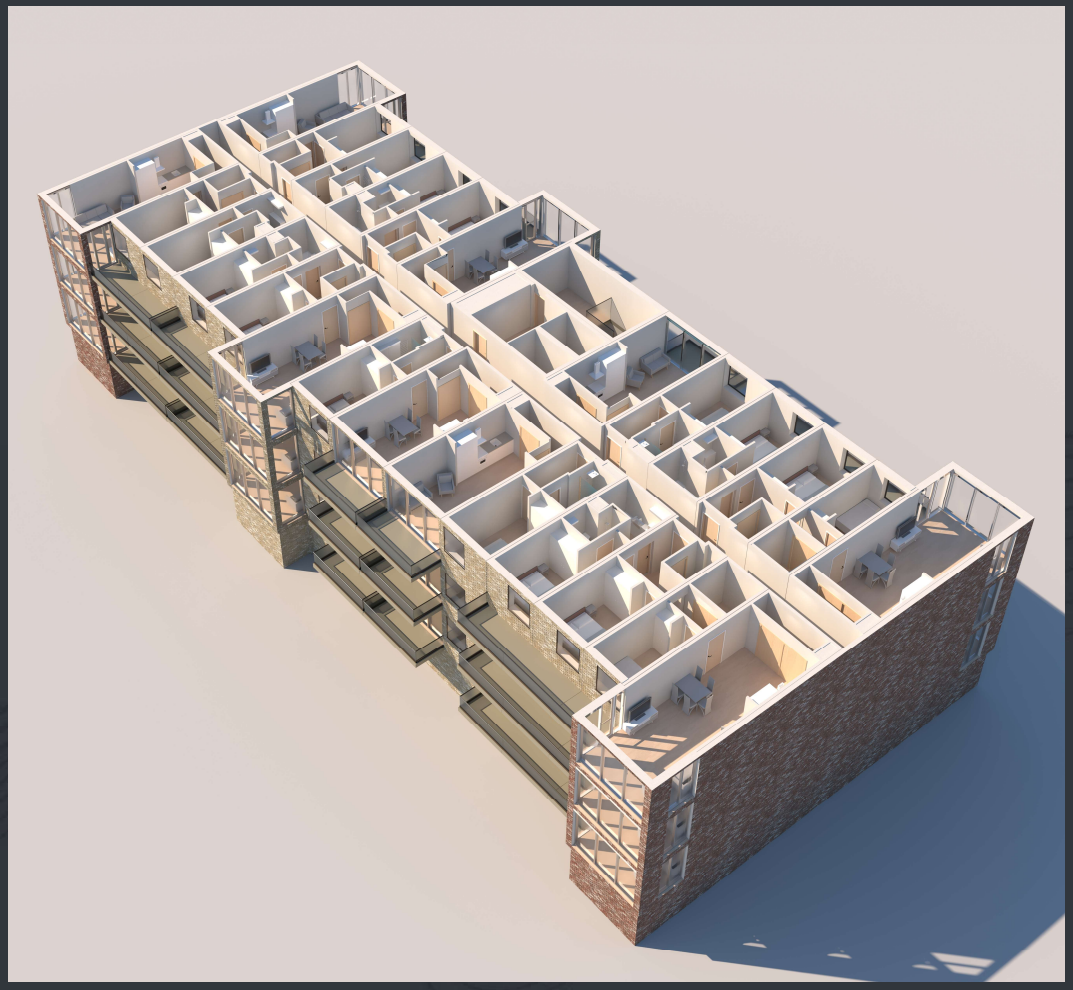
NSAI Agrément Certificate – System & Structural Strategy



- **System:**
  - Hot / Cold Rolled corner post with LGS infill
  - Module max size 14m long x 4.5m wide x 4m tall

- **Structural**
  - Eurocodes
  - Permanent State
    - TGD part A1 Loading
    - TGD part A2 Ground movement
    - TGD part A3 Disproportionate Collapse
  - Temporary State
    - Transport
    - Lifting
  - Connection Design

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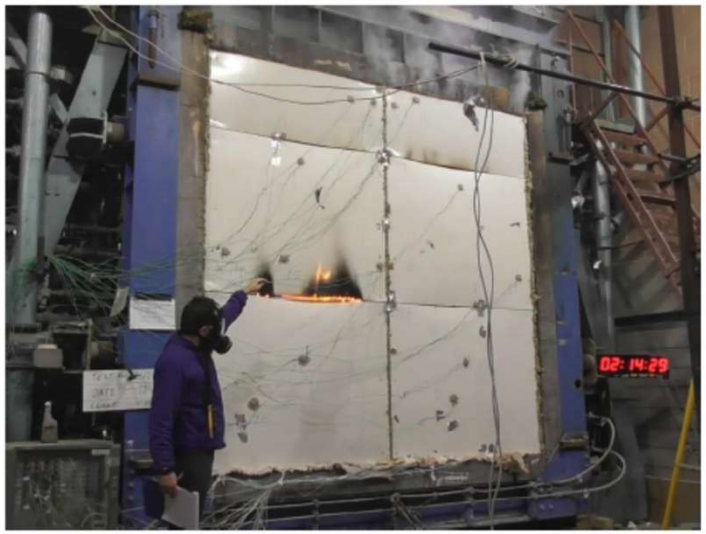
NSAI Agrément Certificate – Fire Engineering



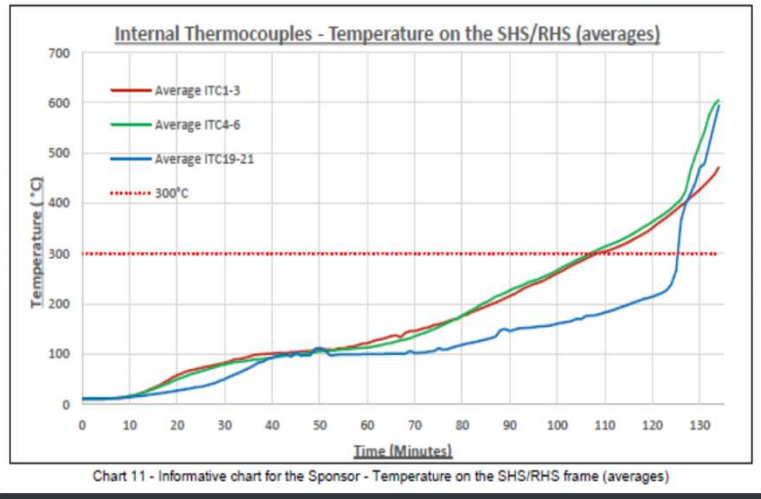


Chart 11 - Informative chart for the Sponsor - Temperature on the SHS/RHS frame (averages)

- **Eurocodes**
- **TGD Part B:**
  - B1 & B6 – Means of Escape in Case of Fire
  - B2 & B7 – Internal Fire Spread (Linings)
  - B3 & B8 – Internal Fire Spread (Structure)
  - B4 & B9 – External Fire Spread

- **Suite of tests**
  - 12no tests total
  - External Walls – In to Out & Out to In – 60, 90, 120min
  - Internal Separating Wall – 90,120min
  - Internal Loading Bearing Walls – 60min
  - Internal Non-Load Bearing Walls – 60min
  - Floors - 30, 60min
  - Not Pass or Fail but to gather performance data

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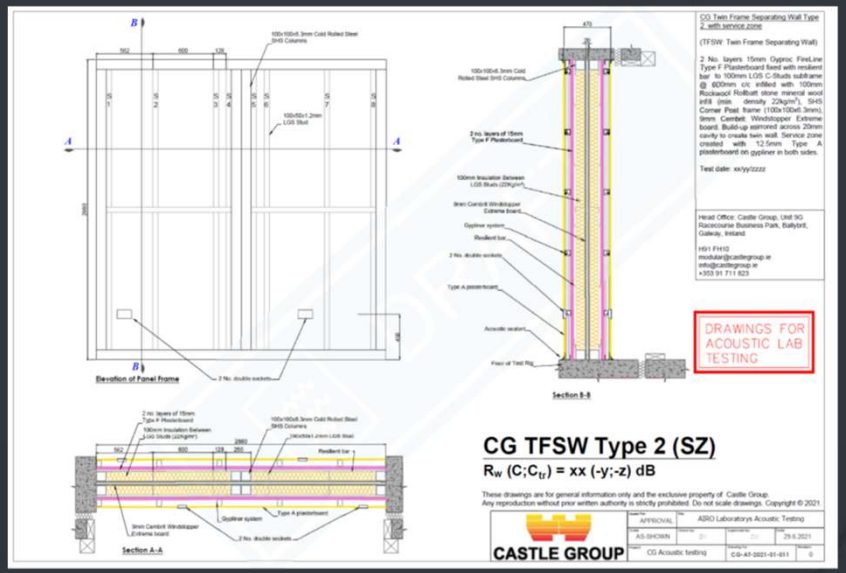
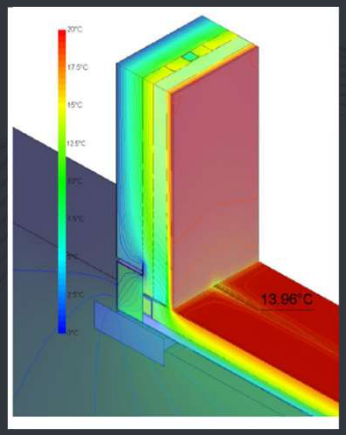
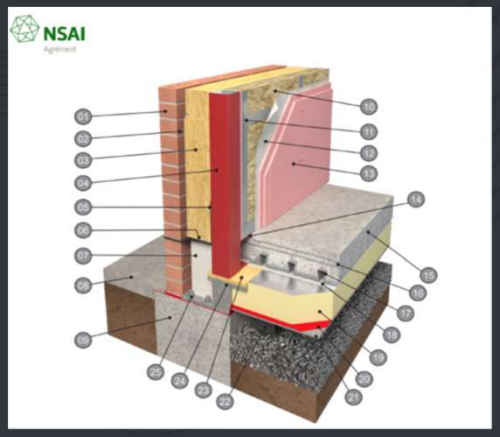
NSAI Agrément Certificate – Acoustic & Thermal



- **TGD Part E - Sound:**
  - 13 Acoustic tests completed
    - External walls
    - Internal Separating Walls
    - Internal Walls
  - Results ranging from 46 bB up to 65 dB





- **TGD Part C, F & L**
  - All junctions modelled for:
    - U value – heat loss through surface area
    - Psi value – Heat Loss through a junction
    - f RSI value – cold bridging

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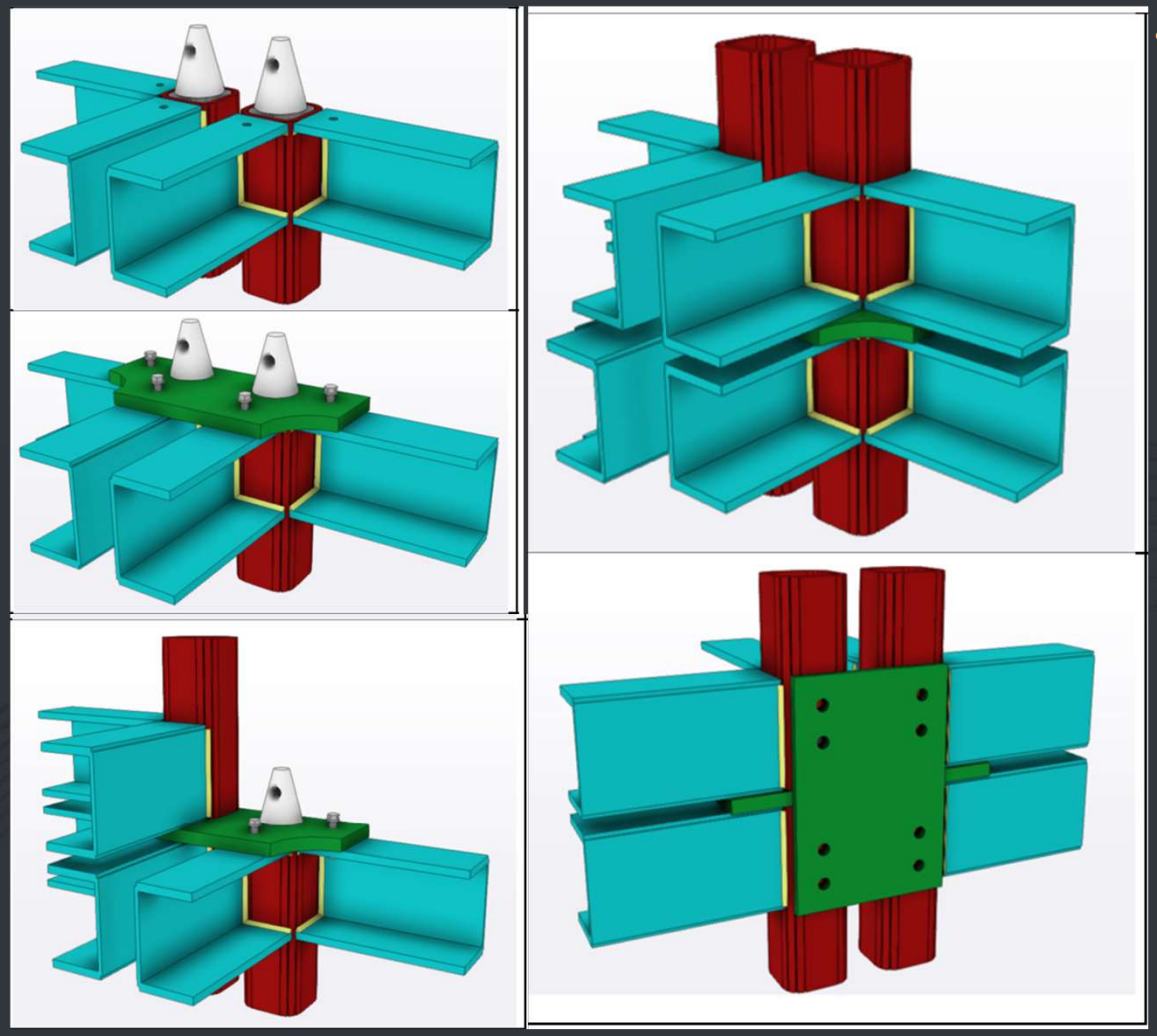
NSAI Agrément Certificate – Connection Detailing



- **Key Considerations:**
  - Structural design
  - Buildability & Tolerance
  - Positioning
  - Locating cone as lifting eye
  - Vertical Tie across connection
  - Horizontal Tie across connection
  - Deflection of module
  - VCL continuity
  - Fire barrier continuity
  - Commercial viability

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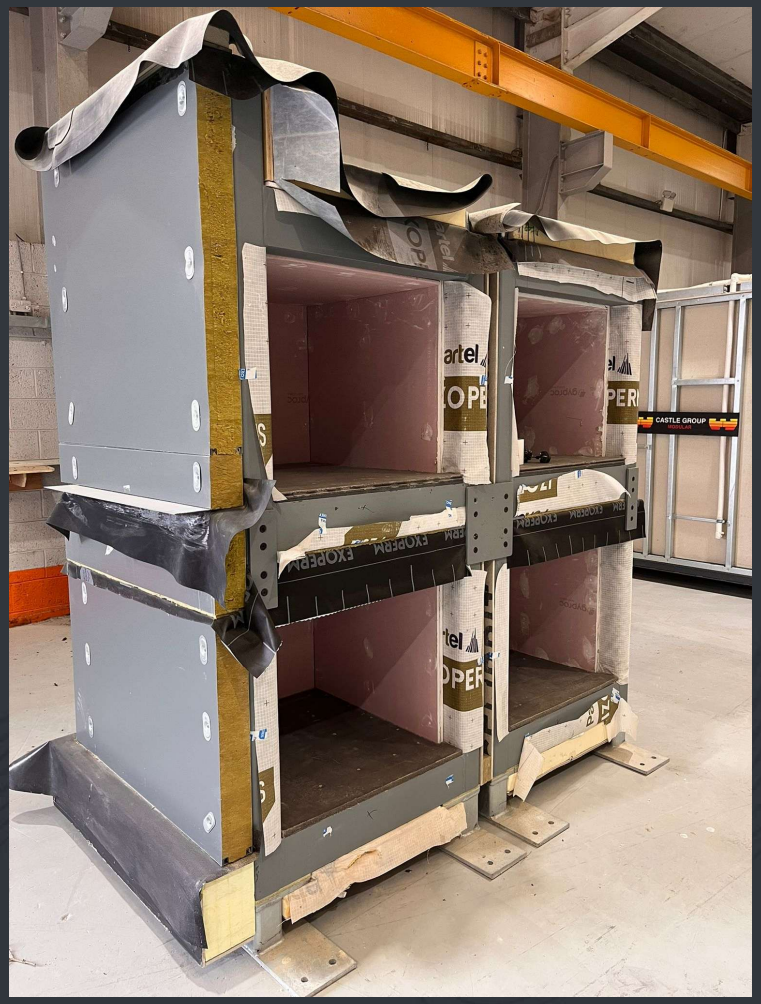
NSAI Agrément Certificate – Certificate Close Out



- Small scale 4 module mockup
  - Connection
  - Fire Barriers
  - Tolerances
  - VCL lapping
  - Galvanized feet and thermal break pads
- System installation Manual
- Method Statement

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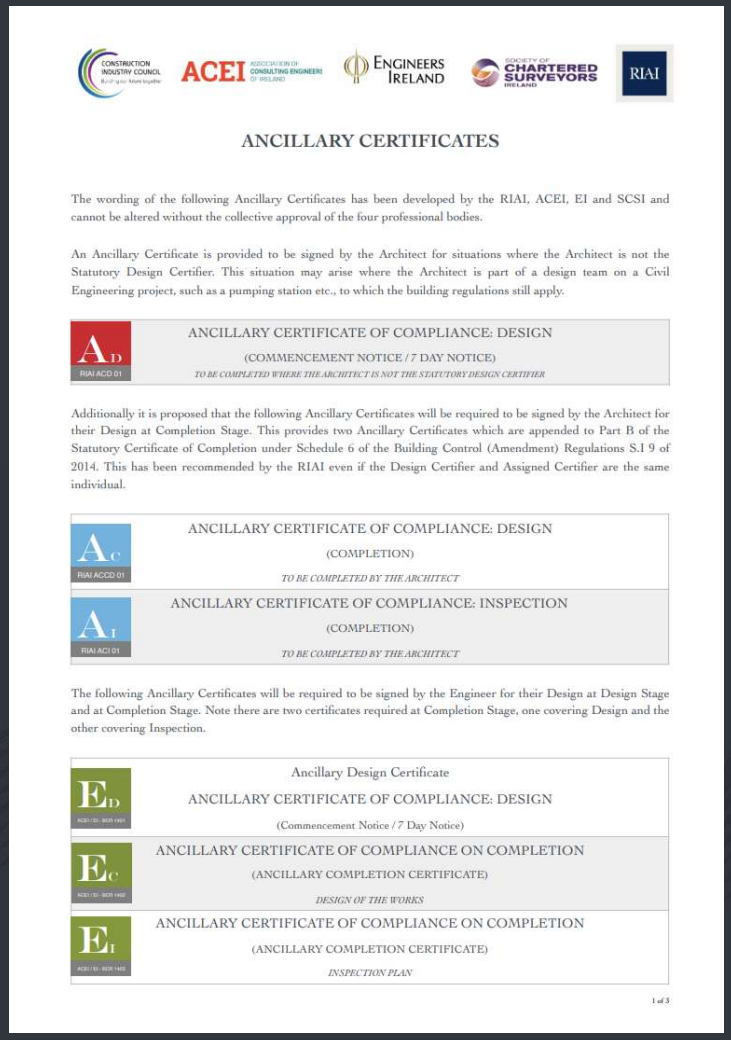
BCAR Process – Roles



ANCILLARY CERTIFICATES

The wording of the following Ancillary Certificates has been developed by the RIAI, ACEI, EI and SCSI and cannot be altered without the collective approval of the four professional bodies.

An Ancillary Certificate is provided to be signed by the Architect for situations where the Architect is not the Statutory Design Certifier. This situation may arise where the Architect is part of a design team on a Civil Engineering project, such as a pumping station etc., to which the building regulations still apply.

A_D RIAI ACD 01	ANCILLARY CERTIFICATE OF COMPLIANCE: DESIGN (COMMENCEMENT NOTICE / 7 DAY NOTICE) *TO BE COMPLETED WHERE THE ARCHITECT IS NOT THE STATUTORY DESIGN CERTIFIER*

Additionally it is proposed that the following Ancillary Certificates will be required to be signed by the Architect for their Design at Completion Stage. This provides two Ancillary Certificates which are appended to Part B of the Statutory Certificate of Completion under Schedule 6 of the Building Control (Amendment) Regulations S.I 9 of 2014. This has been recommended by the RIAI even if the Design Certifier and Assigned Certifier are the same individual.

A_C RIAI ACCD 01	ANCILLARY CERTIFICATE OF COMPLIANCE: DESIGN (COMPLETION) *TO BE COMPLETED BY THE ARCHITECT*
A_I RIAI ACI 01	ANCILLARY CERTIFICATE OF COMPLIANCE: INSPECTION (COMPLETION) *TO BE COMPLETED BY THE ARCHITECT*

The following Ancillary Certificates will be required to be signed by the Engineer for their Design at Design Stage and at Completion Stage. Note there are two certificates required at Completion Stage, one covering Design and the other covering Inspection.

E_D	Ancillary Design Certificate ANCILLARY CERTIFICATE OF COMPLIANCE: DESIGN (Commencement Notice / 7 Day Notice)
E_C	ANCILLARY CERTIFICATE OF COMPLIANCE ON COMPLETION (ANCILLARY COMPLETION CERTIFICATE) *DESIGN OF THE WORKS*
E_I	ANCILLARY CERTIFICATE OF COMPLIANCE ON COMPLETION (ANCILLARY COMPLETION CERTIFICATE) *INSPECTION PLAN*

1 of 3

- **Typical BCAR roles**
  - Design Certifier – Client appointed Agent (Architect)
  - Ancillary Certs issued by Modular Manufacturer
    - Cs (CIF-01)
  - Modular Manufacturer's Sub-Consultant
    - Structural, MEP, Façade, etc.
    - Sd (RIAI ACD 02)
    - Sc (RIAI ACCD 02)
    - Si (RIAI ACI 02)
  - Modular Manufacturer's Sub-Contractors
    - Css (CIF-02)

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BCAR Process – Design

NSAI
Agrément

DESIGN

The Castle Group Modular Building System is intended for use where Architect's finalised construction and fire strategy drawings are available and satisfy the Building Regulations. The Building Owner / Client and their appointed Architect and Engineering Design Team of the Client are responsible for the architectural drawings and compliance of the building design with the applicable Building Regulations and with this certificate.

The Castle Group Chartered Structural Engineer is responsible for the structural design of the modular building system. Depending on the agreed project scope, Castle Group may be responsible for other engineering aspects of the project.

Coordination between Castle Group and the Client's Engineering Design Team is required to successfully complete the project. The Client is responsible for the coordination of Engineering Design Teams.

RESPONSIBILITIES

Prior to the commencement of the contract, the responsibilities are determined and agreed between Castle Group and the Client including substructure, fire stopping, cavity barriers, roof completion, coordination of design and other elements.

- The Building Owner and their appointed team of Architects and Engineers remain responsible for the overall design.
- Modular Manufacturer typically will be responsible for:
  - Structure from foundations up
    - Loadings provided to Design Team
  - Optional:
    - MEP
    - Façade
    - Elements of Design co-ordination

- **Early engagement and collaboration are key to success**

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BCAR Process – Deviations from Agrément Certificate

The system has been assessed with traditional brick and block outer leaf cladding. Other external façade claddings systems may be suitable but have not been considered as part of this certification.

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	• 100mm Isover Spacesaver mineral wool between the joists • 1No. layer of 18mm OSB3 fixed to LGS joists 4.8 x 44mm screws at 400mm centres.			
Compartment/Separating Floor **				
7	Loaded Floor supporting Imposed Load of 2.0kN/m² 140mm normal weight concrete with 1.2mm Tata Comflor 51. Concrete reinforced with 2 layers of A252 Mesh (30mm cover), 1No. 10mm bar per trough (50mm cover) – 3900mm span.	Eurocode design	90 mins from below ceiling level	1(a), 1(b), 1(c), 1(d), 2(a), 2(b), 3, 4(a), 5(a), 5(b)

Notes:

- The above build-ups are summaries of those tested to the referenced standards – they should not be taken as an exhaustive list. For full details of test reports, the Certificate holder should be contacted.
- For alternative approaches to fire safety requirements, refer to 0.2 of TGD to Part B of the Building Regulations.
- Stone mineral wool refers to the particular type and density of stone mineral wool used in a particular fire test and the details are available directly from Castle Group.
- Joints are staggered on successive layers of plasterboard.
- All wall tests were completed without the joints being taped and jointed.

* Non-load bearing wall fire resistance data is provided from the load bearing data and can be utilised under the Field of Direct Application whereby the load can be decreased on the specimen.

** Design to be dictated by project specific loading and span requirements on a case-by-case basis in accordance with I.S. EN 1994-1-2[28]

*** Design to be dictated by project specific loading and span requirements on a case-by-case basis in accordance with P424[39]

3.1.3 Superstructure Design

The design must be in accordance with I.S. EN 1993-1-1[7] and Part A of the Building Regulations.

The structural assessment of the Castle Group Modular Building System shall be site specific and project specific. Castle Group Chartered Structural Design Engineer suitably qualified in steel modular design shall undertake the structural engineering of the system. Design supervision level shall be in accordance with I.S. EN 1990[17] (minimum DSL2 to be employed).

The design shall cover all structural elements of the system (e.g. primary main steel elements, LGS infill, connections design, stability) and consider all different loadings scenarios during the manufacture, transport, lifting and permanent state.

The design load shall be in accordance with:

- I.S. EN 1990[17]
- I.S. EN 1991-1-1[18]
- I.S. EN 1991-1-4[19]
- I.S. EN 1991-1-3[20]

Snow and wind loads must be based on guidance given in TGD to Part A of the Building Regulations.

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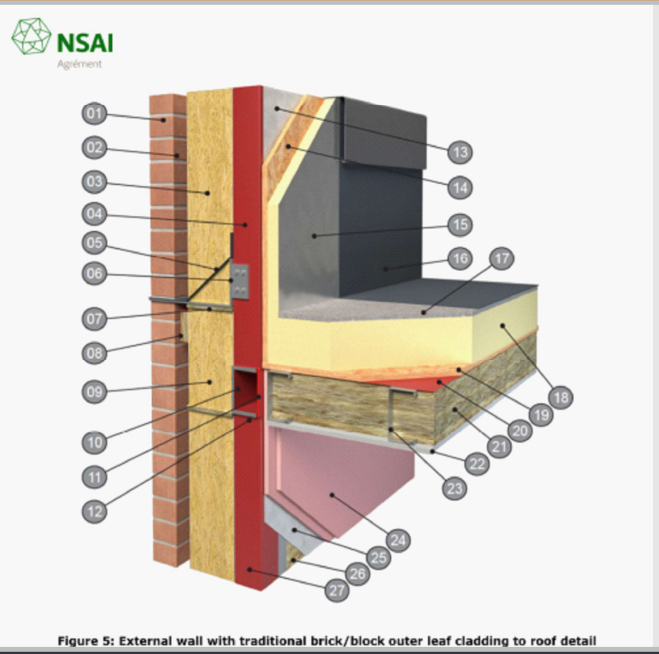
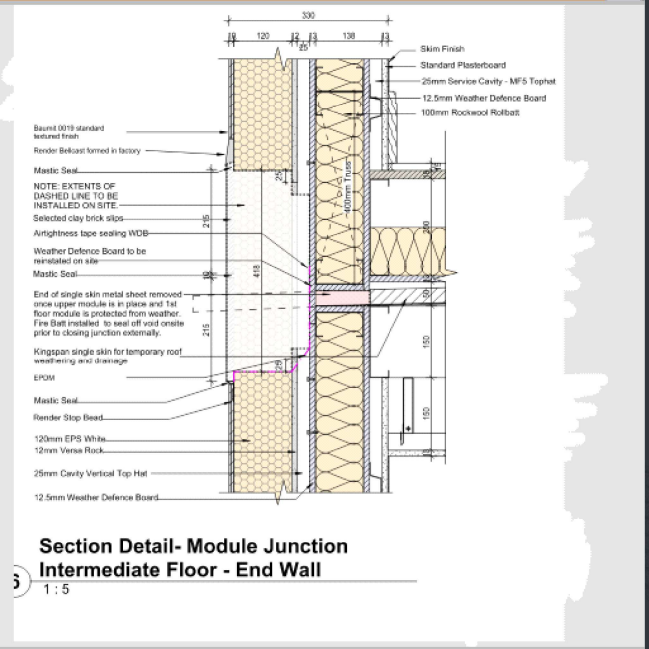
BCAR Process – Deviation Matrix

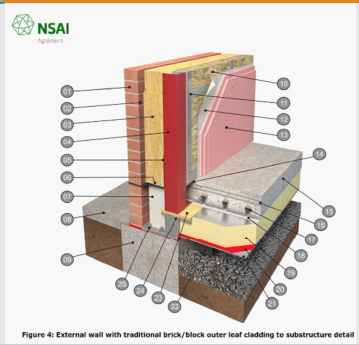
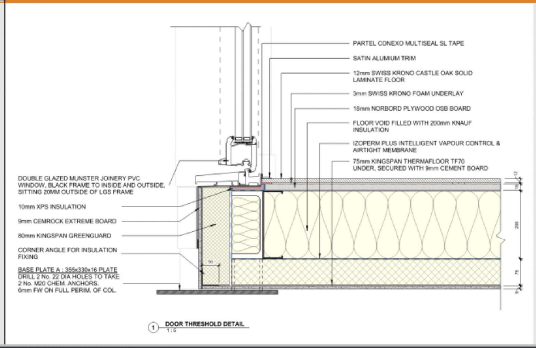
Load Bearing Walls 2.1.3

Materials	NSAI	Proposed
Typical external wall build up with traditional brick/block outer leaf cladding consists of: . Plasterboard, in accordance with this Certificate (refer to Table 1) Air and vapour control layer (AVCL), External wall structure with mineral wool insulation between the studs, External insulation layer (mineral wool), Stainless brickwork/blockwork outer leaf Refer to Figure 3 & Figure 5 for typical external wall details. . . steel	 Figure 5: External wall with traditional brick/block outer leaf cladding to roof detail	

BCAR Process – Deviation Matrix

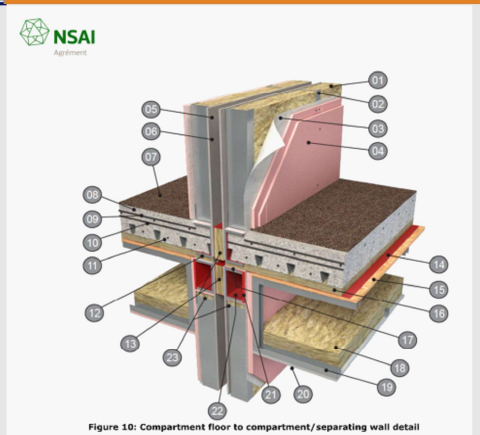
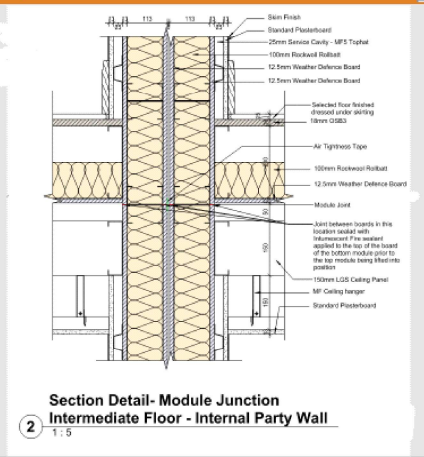
Ground Floor

2.1.2

MATERIALS	NSAI	Proposed
The ground floor is constructed from the following: 150mm void and radon sump, 9mm cement board, · DPM/Radon barrier, . XPS insulation installed by others on site, . AVCL wrapped around the module . Ground Floor Structure (Composite Concrete Metal Deck or LGS floor joists on main structural steel) . Floor finishes by Castle Group or others	 Figure 4: External wall with traditional brick/block outer leaf cladding to substructure detail	

Compartment Walls

2.1.7

Materials	NSAI	Proposal
Plasterboard, in accordance with this Certificate (refer to Table 1) Air and vapour control layer (AVCL), . HR/CR primary steelwork and LGS infill from module 1 with mineral wool insulation between the steelwork (forming part of modular unit 1 by Castle Group) Fibre-cement board (refer to Table 1) 50mm cavity Fibre-cement board (refer to Table 1) HR/CR primary steelwork and LGS infill from module 2 with mineral wool insulation between the steelwork (forming part of modular unit 2 by Castle Group) Air and vapour control layer (AVCL), Plasterboard, in accordance with this Certificate (refer to Table 3)	 Figure 10: Compartment floor to compartment/separating wall detail	

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BCAR Process – Factory

- ISO Accreditation for 9001, 45001, 14001
- EN 1090 up to Execution Class III Accreditation for Hot & Cold Rolled Steel
- EN 1090 Accreditation for Light Gauge Steel Frame modular Products
- Common Data Environment (CDE) – Dalux
  - All drawing revisions
  - All tech subs
  - All QA / QC inspections recorded and issued digitally
  - Laptops, Tablets and large scale touch screens
- QR Codes for each module
- Every stage of the manufacturing recorded for every module:
  - Structure, VCL, MEP, Void Closure, Passive Fire, etc.
- Ability for 3rd party inspections to be recorded digitally

- BCAR inspections take place across multiple modules

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BCAR Process – Factory

DV1 Steel inspection

Deviation

Project	Microsoft CWL01 - Guardhouse	Work package	Castle Group Modular
Project no.	TBC	Workflow	Inspections
Building	CWL01 - Guardhouse	Date created	15 Jul 2025, 16:54
Level	Structural Steel Floor Plan	Created by	Thaynara Paz, Castle
Drawing	Primary Steel Frame (Version 1)	Substitute for	Mark Moran
Coordinates	328223.36896 184198.61687 14.35000		

15 Jul 2025, 16:54
Assigned to -

Created by:	Thaynara Paz, Castle
Substitute for:	Mark Moran
Assignee:	-
Subject:	Steel inspection
Description:	After the steel frame was completed, additional plates were requested by Castle. To install them, Ard had to sand off a layer of paint before welding the pieces in place. During this process, debris fell onto the paint and became embedded in the surface. After welding, a new coat of paint was applied, however, the the frame was left outside the factory, where further contamination likely occurred. The resulting debris is now mixed into the paint and can be easily removed by hand, pulling the paint off with it. The DFT is so high that our measuring equipment cannot register a reading.

1.1, 2025-07-15, 15.20

1.2, 2025-07-15, 15.19

Dalux Field

Printed 15 Jul 2025, 16:54
Thaynara Paz

Page 1 of 2

Sample Inspection Record

- Activity / task under inspection
- Drawing / spec reference
- 3D model reference location of snag / comment
- Responsible company and person tagged
- Description of snag / comment
- Ability to forward snags to individual / company
- Ability to close out items on the platform

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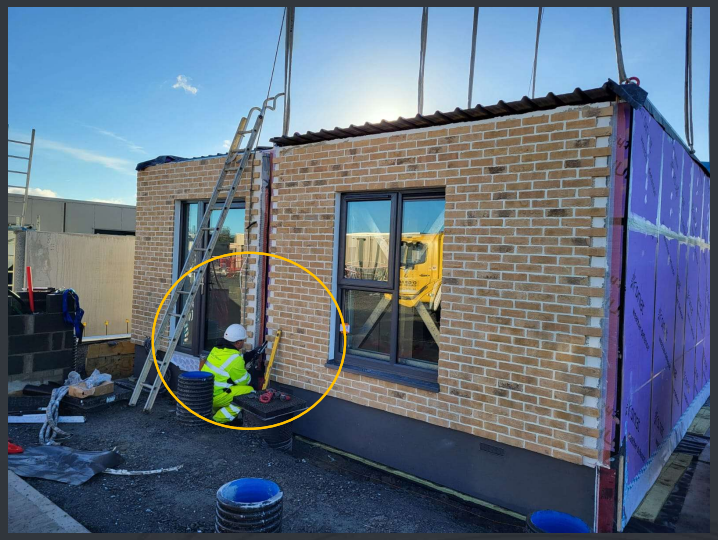
BCAR Process – Site



- Dalux CDE utilized on site:
  - Temporary protection intact
  - Levelling and shims
  - Cavity Barriers
  - Alignment
  - VCL lapping
  - Service pop ups
  - Etc.

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Case Study

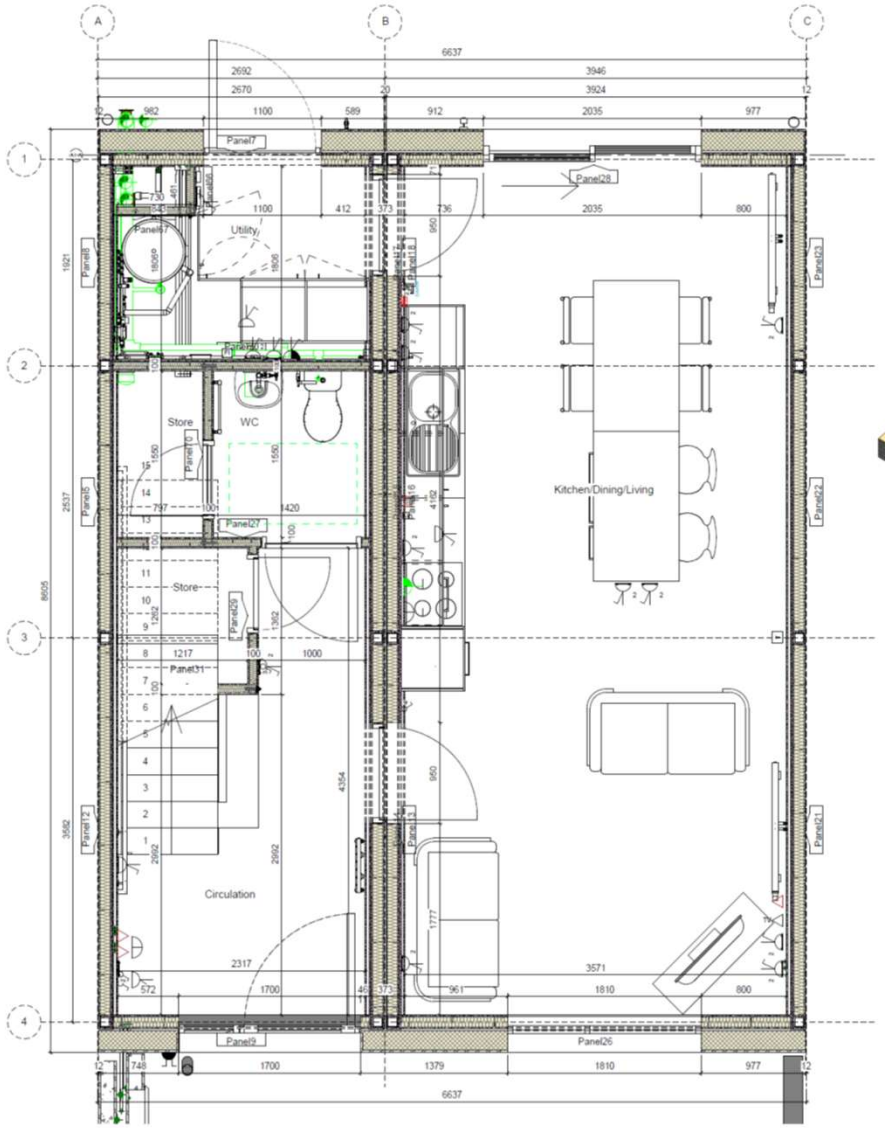
- Compliant with all Social & Affordable requirements
- 90m2
- 3 bed Terrace
- A2 rated
- 4 modules per house
- 90% PMV


Genie
E-DRIVE

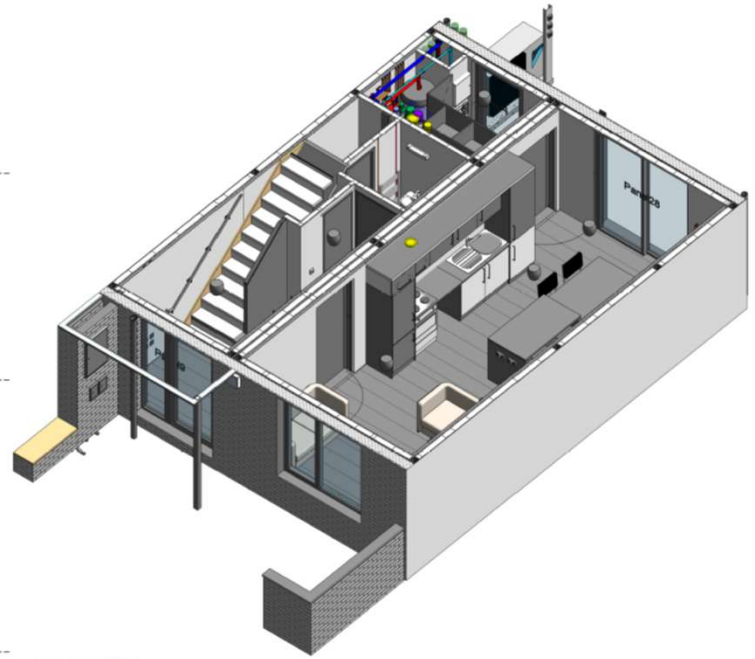

CASTLE GROUP
MODULAR


CASTLE GROUP
MODULAR


CASTLE GROUP
MODULAR



1 Primary Steel Level
1 : 20



2 Ground Floor Section

3 Steel View Ground Floor

REV	DATE	DESCRIPTION	DRW
P-01	15/06/2023	Issued as tender	FH

TENDER

PROJECT
PROJECT URMA 2

CASTLE GROUP
MODULAR
Raheen, Gort, Co. Galway, H91 KP46
Tel:(091) 771823
Web: www.castlemodular.com
Email: modular@castlegroup.ie

TITLE
GA Plans - Type A
Ground Floor Plan

DRAWN:	CHECKED:	DATE:
FH	NH	15/06/2023

SCALE @ A1:	DRAWING No.
1 : 20	URMH 2-CGM-XX-ZZ-DR-X- 0001

PROJECT NUMBER:	STATUS	REVISION
URMA 2	D2	P-01

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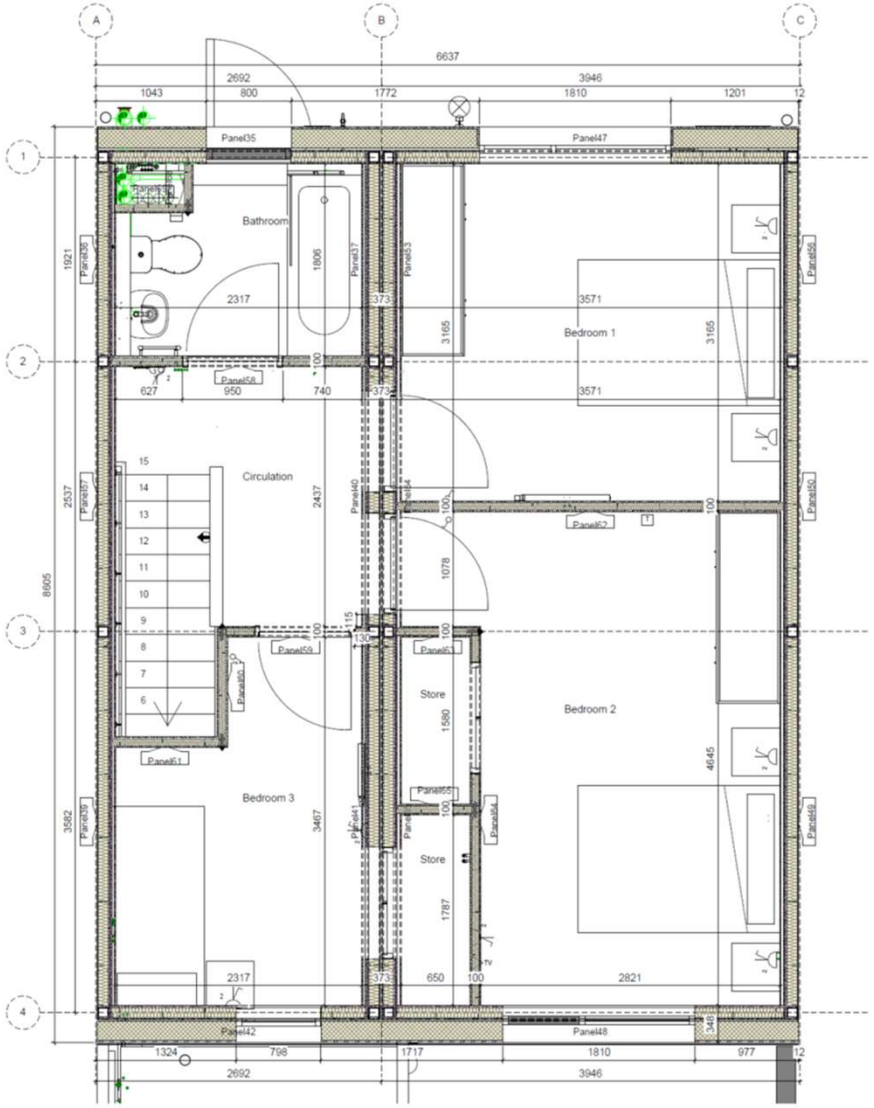
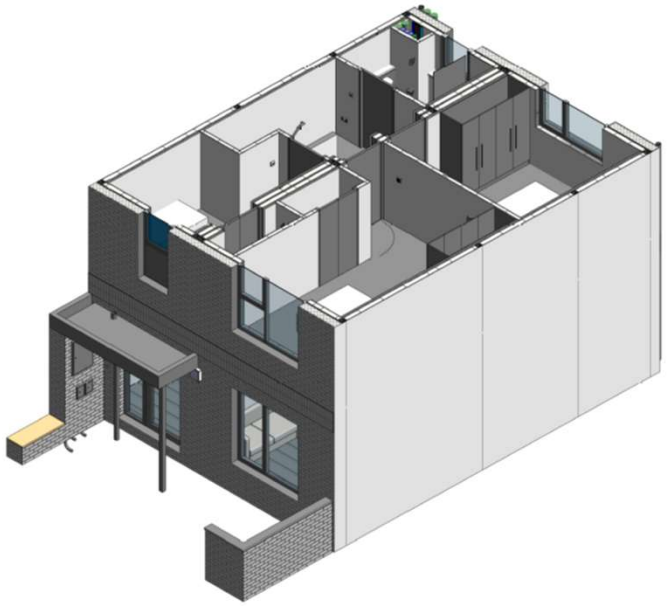
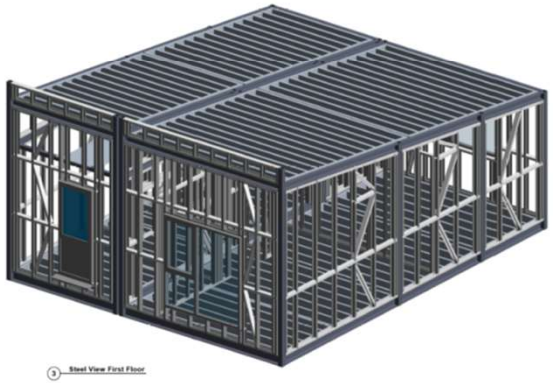




2 First Floor Section



3 Steel View First Floor

REV	DATE	DESCRIPTION	DRW
P-01	15/06/2023	Issued as tender	FH

TENDER

PROJECT

PROJECT URMA 2

CASTLE GROUP
MODULAR

Raheen, Gort,
Co. Galway,
H91 KP46

Tel:(091) 771823
Web: www.castlemodular.com
Email: modular@castlegroup.ie

TITLE

GA Plans - Type A

First Floor Plan

DRAWN:	CHECKED:	DATE:
FH	NH	15/06/2023

SCALE @ A1:	DRAWING No.
1 : 20	URMH 2-CGM-XX-ZZ-DR-X- 0002

PROJECT NUMBER:	STATUS	REVISION
URMA 2	D2	P-01

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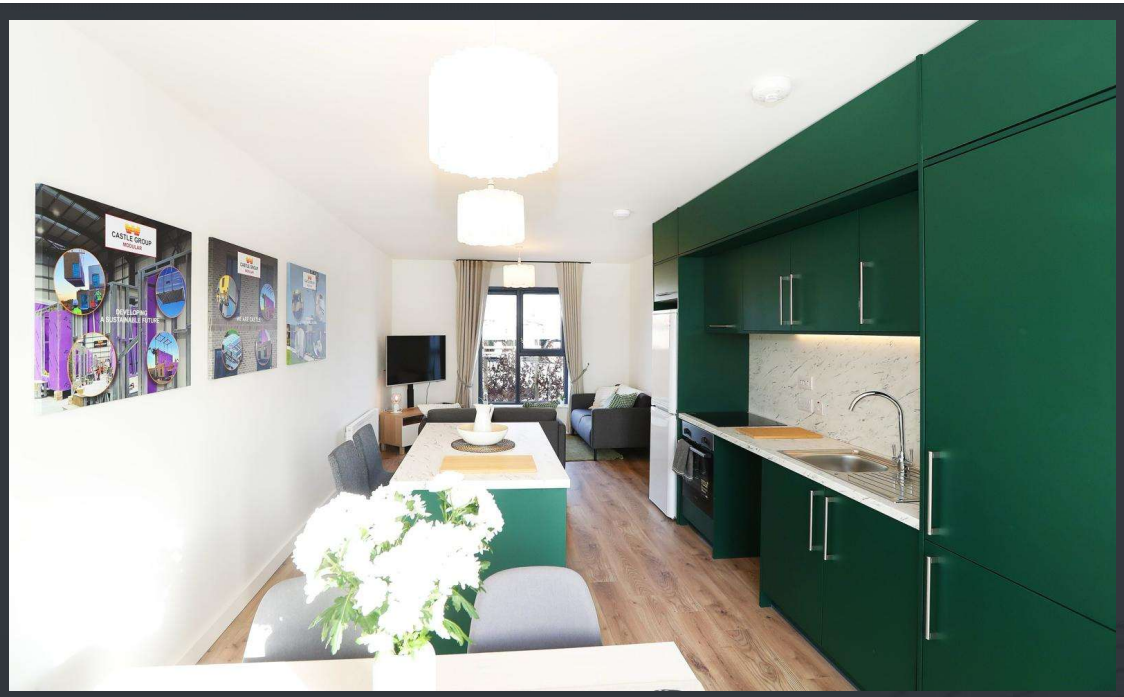
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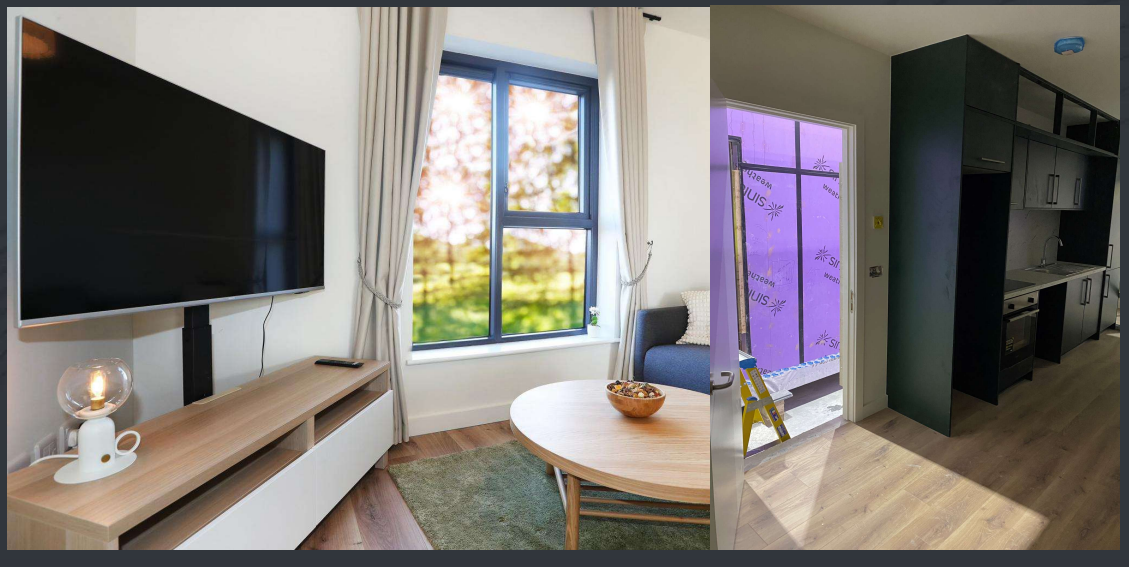
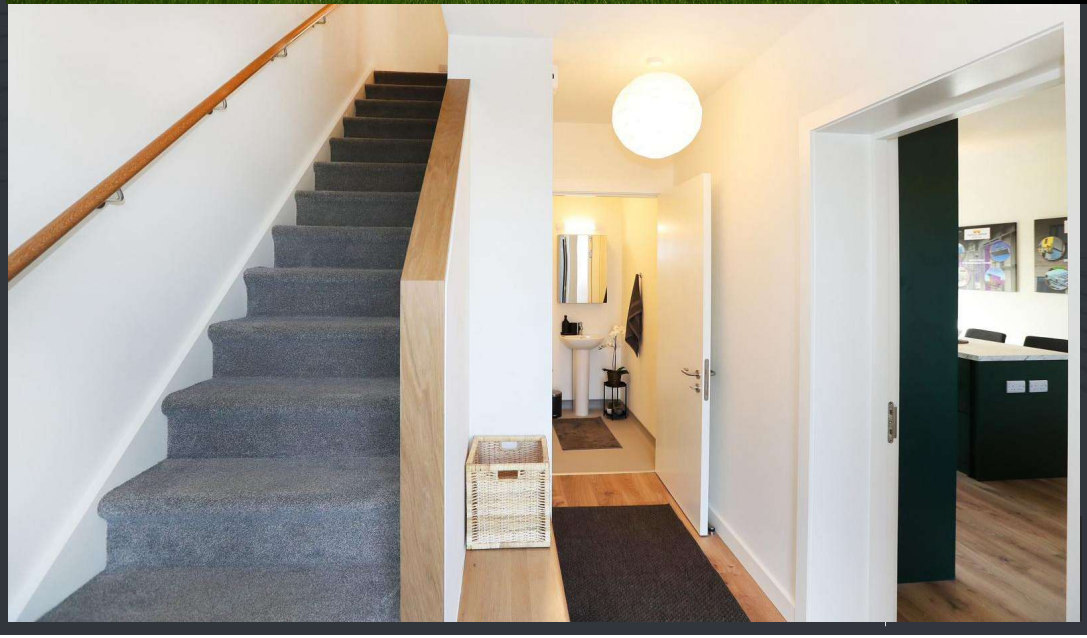
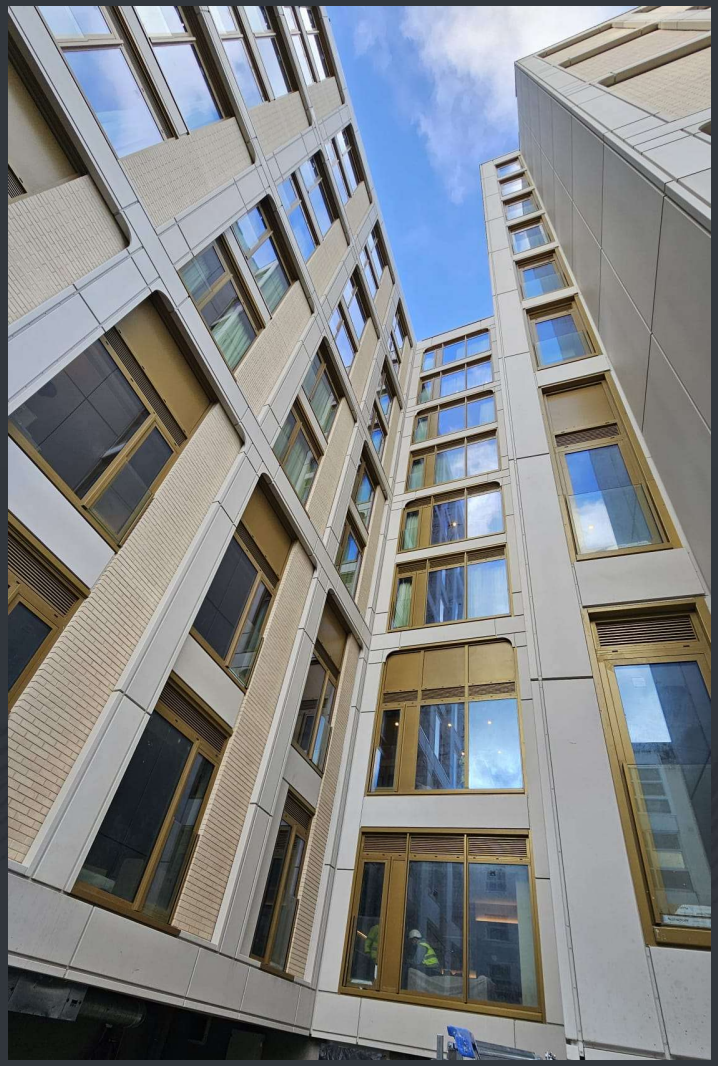
DEVELOPING A SUSTAINABLE FUTURE





Where next?



- **Growth in the Market** - Further Accreditation for other 3D volumetric companies.
- **Further Adoption** - driven by private sector non-residential
- **Increased Complexity**
- **Deeper understanding of Deviations** - Agrément not a one size fits all
- **Standardisation & Frameworks** to ensure commercial viability
- **Learning from other markets**

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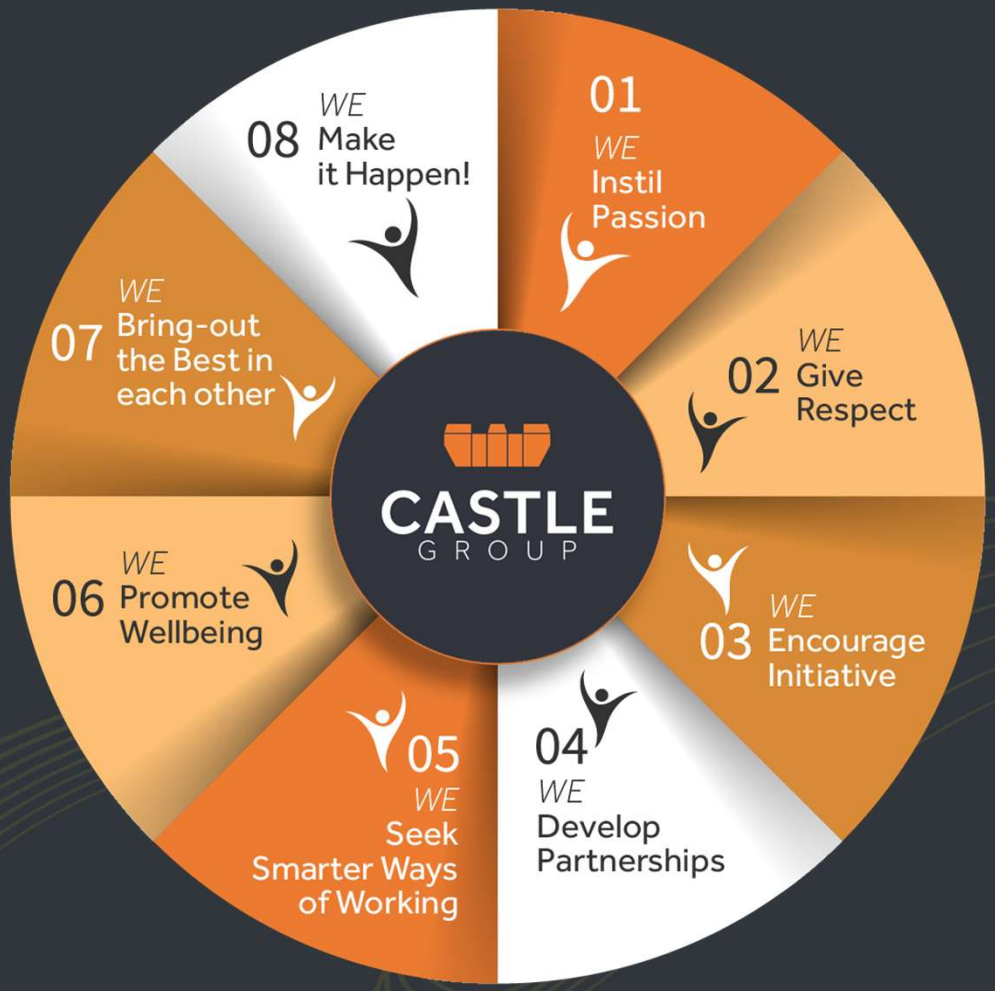

THANK YOU

CELEBRATING 25 YEARS of INNOVATION AND QUALITY