

# Automation

Series 2025

Work smarter, not harder

**CitA25**

*Driving Digital Construction  
for 25 years*

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# HTL

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## .TECH

Transforming Construction: 3D Construction Printing and  
Ireland's First Certified 3DCP Housing Scheme

## Where HTL Fits In

1

Dep. Of Housing Category 4 of MMC

#

CATEGORY DEFINITION

1

Pre-manufacturing (3D primary structural systems)

2

Pre-manufacturing (2D primary structural systems)

3

Pre-manufacturing components (non-systemised primary structure)

2

On-site construction of digital model

4

Additive manufacturing (structural and non-structural)

5

Pre-manufacturing (non structural assemblies & sub-assemblies)

6

Traditional building product led site labour reduction / productivity improvements

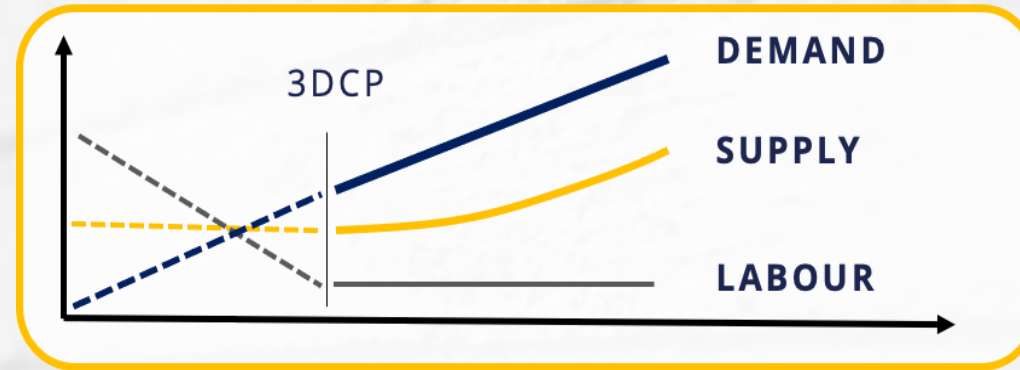
7

Site process led site labour reduction / productivity / assurance improvements

3

Shorter construction timelines = increase in housing delivery

# What Problem Do We Solve



## 1 Speed / Output

- **25-30% reduction** in Construction programme\*\*
- **80** no. superstructures \*\* p.a. per machine

## 2 Reduced Labour

- 3 - 4 operators p. machine
- 40 - 50% more efficient **use of labour**

## 3 Leverage Tech / Digitalization

- Transfer of BIM model to deliver on site structure **accurately & reliably**
- **Other Components prefabricated** before project start and fitted with 24 hrs.

## 4 Quality & Accuracy

- 100 year+ lifecycle
- 5x stronger than block (**8.5Mpa vs 50 Mpa**)
- 5mm tolerance (vs 20mm)
- **Fire Resistant**
- **Acoustic Transmission**

## 5 Sustainability

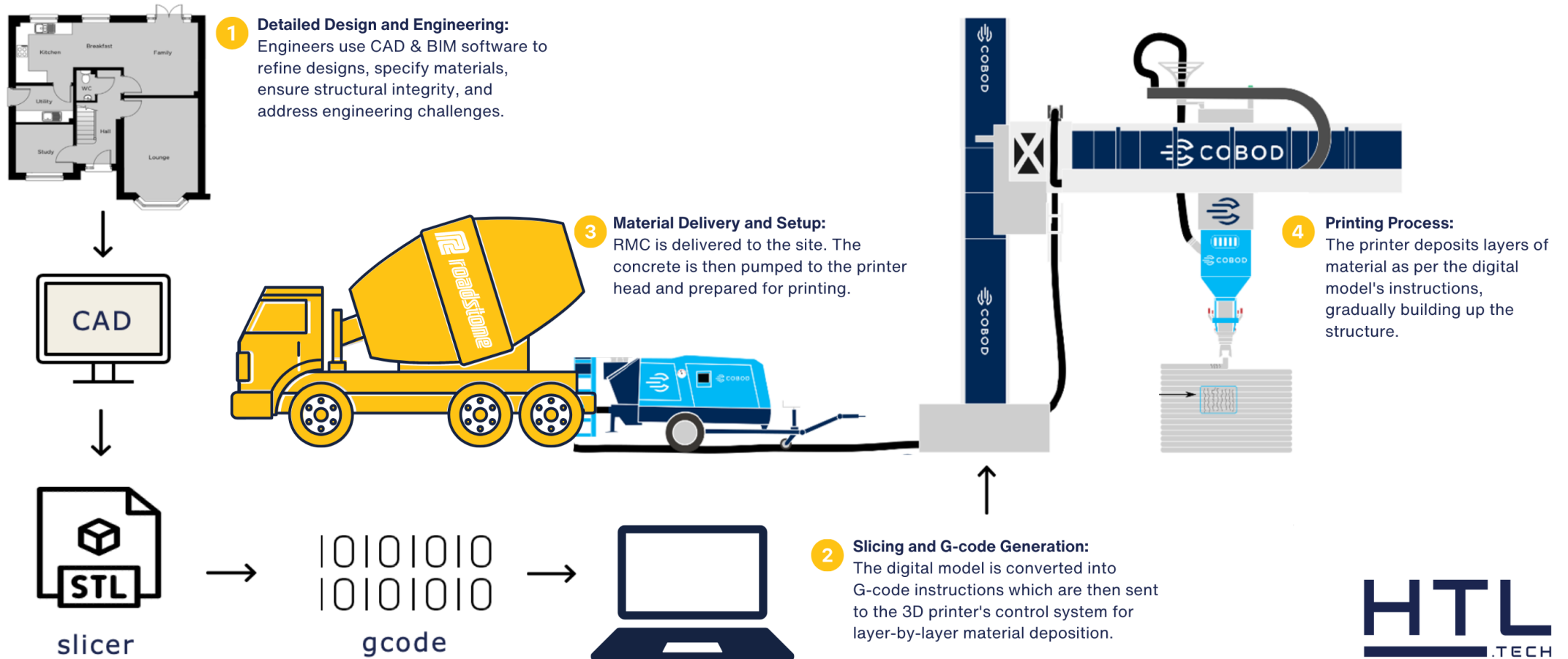
- **Reduced waste** with accurate material placement
- Phase 2 detail **comparable with Timber Frame carbon embodiment**
- **Thermal mass** can be used to moderate heating & cooling
- Readily exceeds **Passive grade airtightness**

## 6 Project Certainty / Cost

- On **Time**,
- On **Budget** &
- Delivering **Value**
- Estimated **5-10% saving per Home\*\***

\*\* Comparative based on terraces of 4 no. 3 Bed Homes (c. 110 sqm ea ) using 3DCP Superstructure at full output vs. traditional masonry cavity wall methodology

## 3DCP Process Overview



## 3DCP Regulatory Compliance

### Testing Standard

- I.S. EN 12350  
Fresh Concrete
- I.S. EN 12390  
Hardened Concrete
- I.S. EN 13791  
Concrete Strength
- I.S. EN 12504  
Concrete in Structures

### Constituents

- I.S. EN 197-1  
Cement
- I.S. 12620  
Aggregates
- I.S. 1008  
Mixing water
- I.S. EN 15167-1  
Blast furnace Slag
- I.S. EN 450-1  
Fly Ash
- I.S. 13263-1  
Silica Fume
- I.S. 934 – 1&2  
Admixtures
- I.S. 934 – 1&2  
Admixtures
- I.S. EN14889-1&2  
Fibres
- I.S. EN 12878  
Pigments

Building Regulations 2012: Parts A-M

I.S. EN 1991 (EC1): Basis of Design and Actions on Structures (Parts 1-1&2)

### Materials Standard

I.S. EN 206

I.S. EN 206

### Design Standard

I.S. EN 1992  
(EC 2)  
Design of Concrete  
Structures

I.S. EN 1996  
(EC 6)  
Design of Masonry  
Structures

### Execution

I.S. EN 13670  
Execution of  
Structures

EN 1996-2  
Considerations, Material  
selection, Execution of  
Masonry

I.S. EN ISO/ASTM 52939 NSAI Standard

Additive Manufacturing for construction – Qualification principles – Structural & infrastructure elements



Grange Close

GRANGE  
CLOSE

# GRANGE CLOSE, DUNDALK CO. LOUTH

HARCOURT Technologies Ltd



# PROJECT OVERVIEW



Grange Close - Housing for All Solution – by HTL.tech (2024)



Print time: 12 days

- Load-bearing structural concrete
- BCAR compliant design
- NZEB accreditation

## Project overview



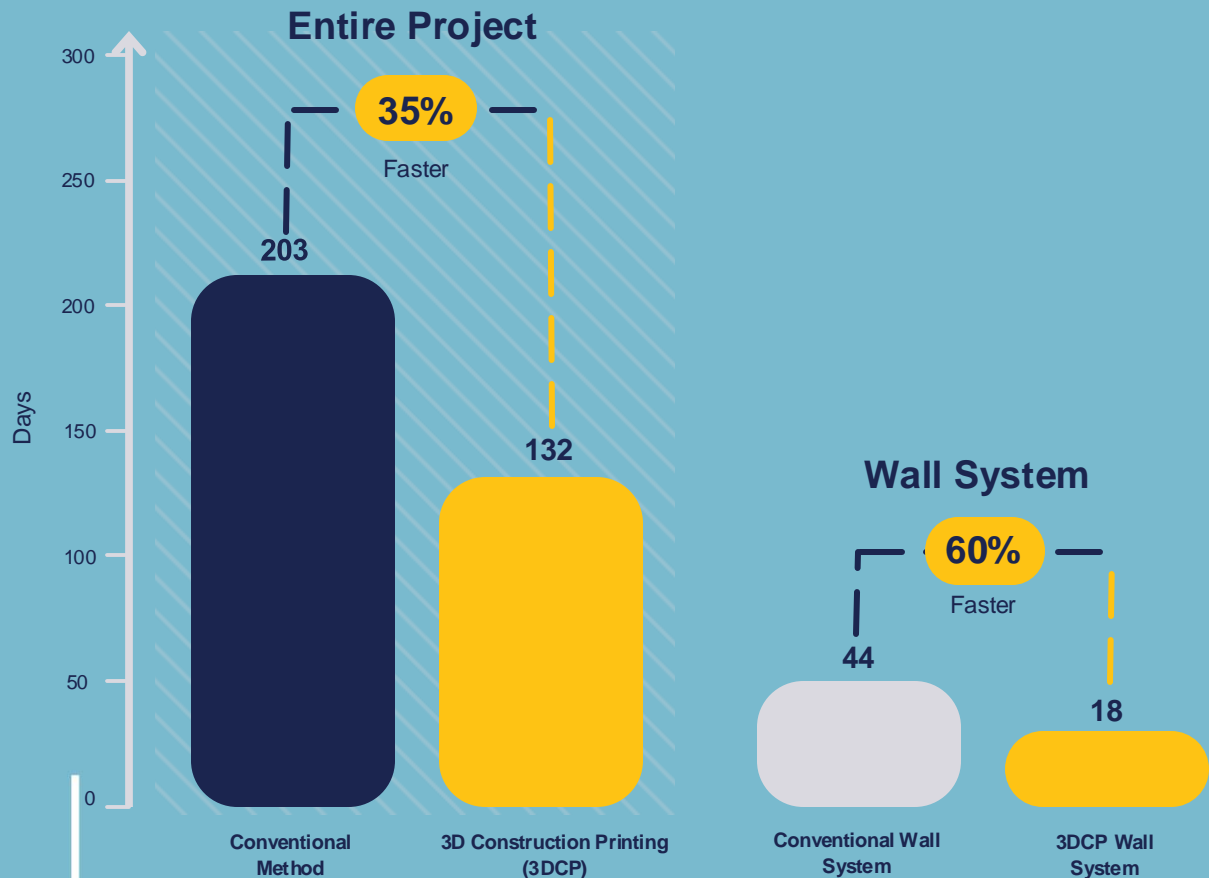
3 no. 3 Bed Homes  
330 m<sup>2</sup> (~3,550 sq ft) in  
2 floors over 3 units





## 3DCP Accelerates Construction

Grange Close Metrics



### Completion Time

132 working days  
(35% faster than traditional methods)

### Total Superstructure

**18 days**

### 330 m<sup>2</sup> over 18 days

60% of time savings

### Total Compression

Strength:  
**47 MPa**

### Regulations

BCaR &  
ISO/ASTM 52939:2023  
compliant

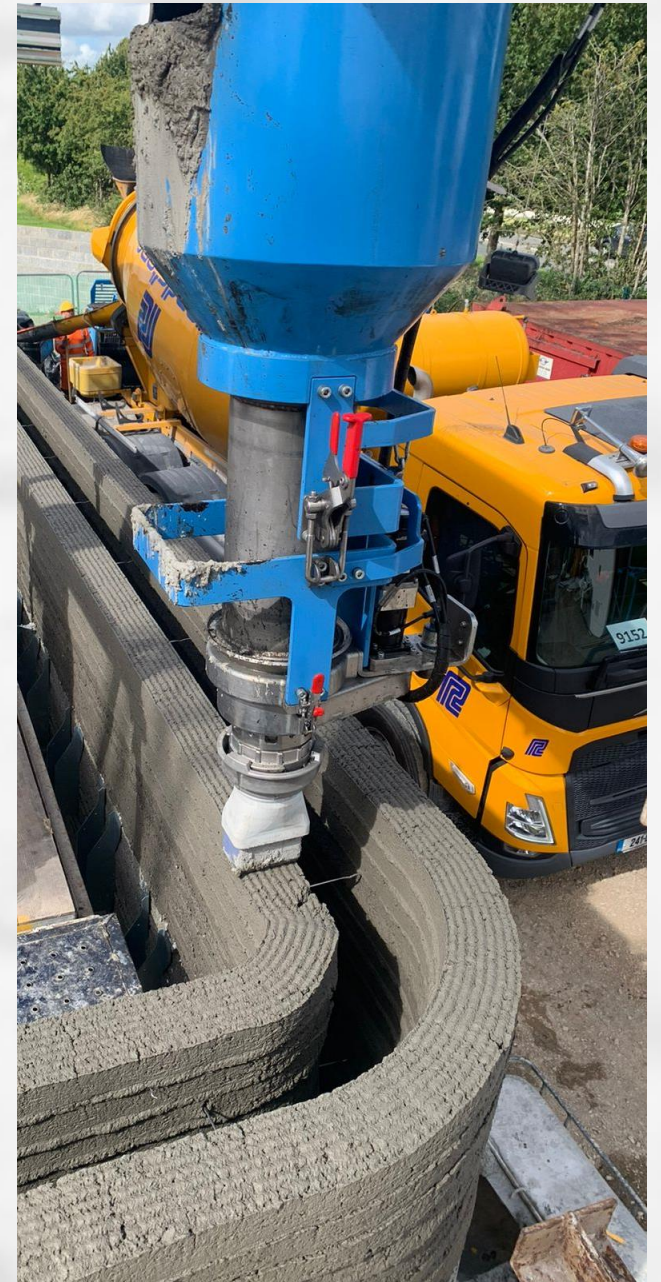
C30/37  
EN206 RMC

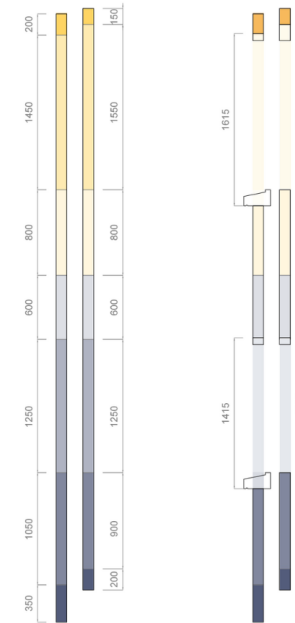
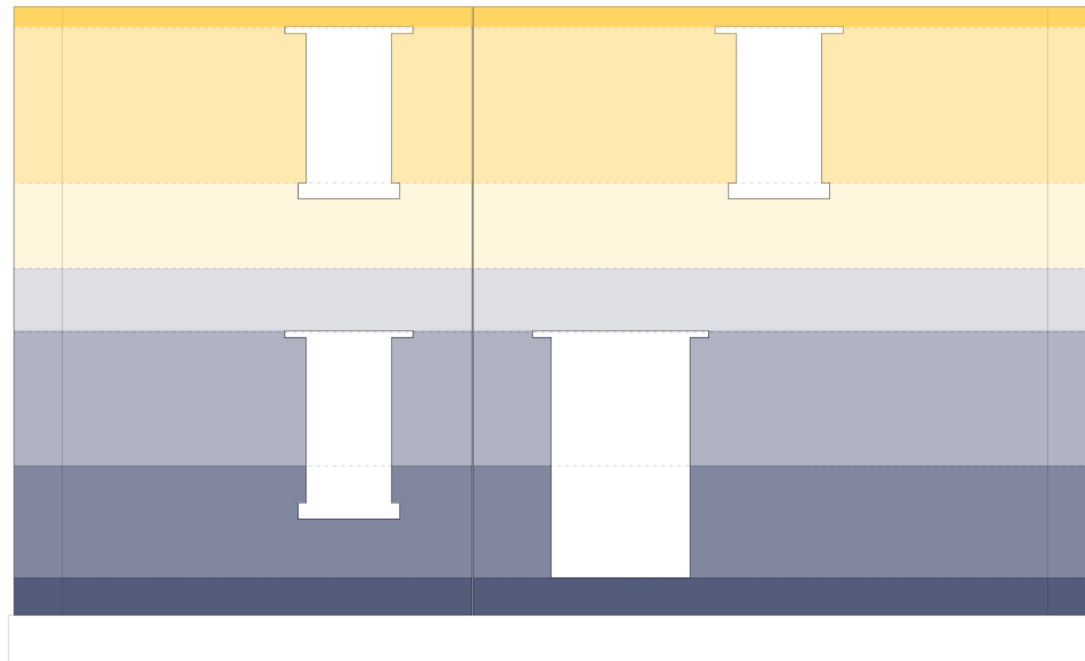
### Airtightness

**0.3 ACH**

**Lowest embodied  
carbon mix to save  
278 kg CO<sub>2</sub>/m<sup>3</sup>**



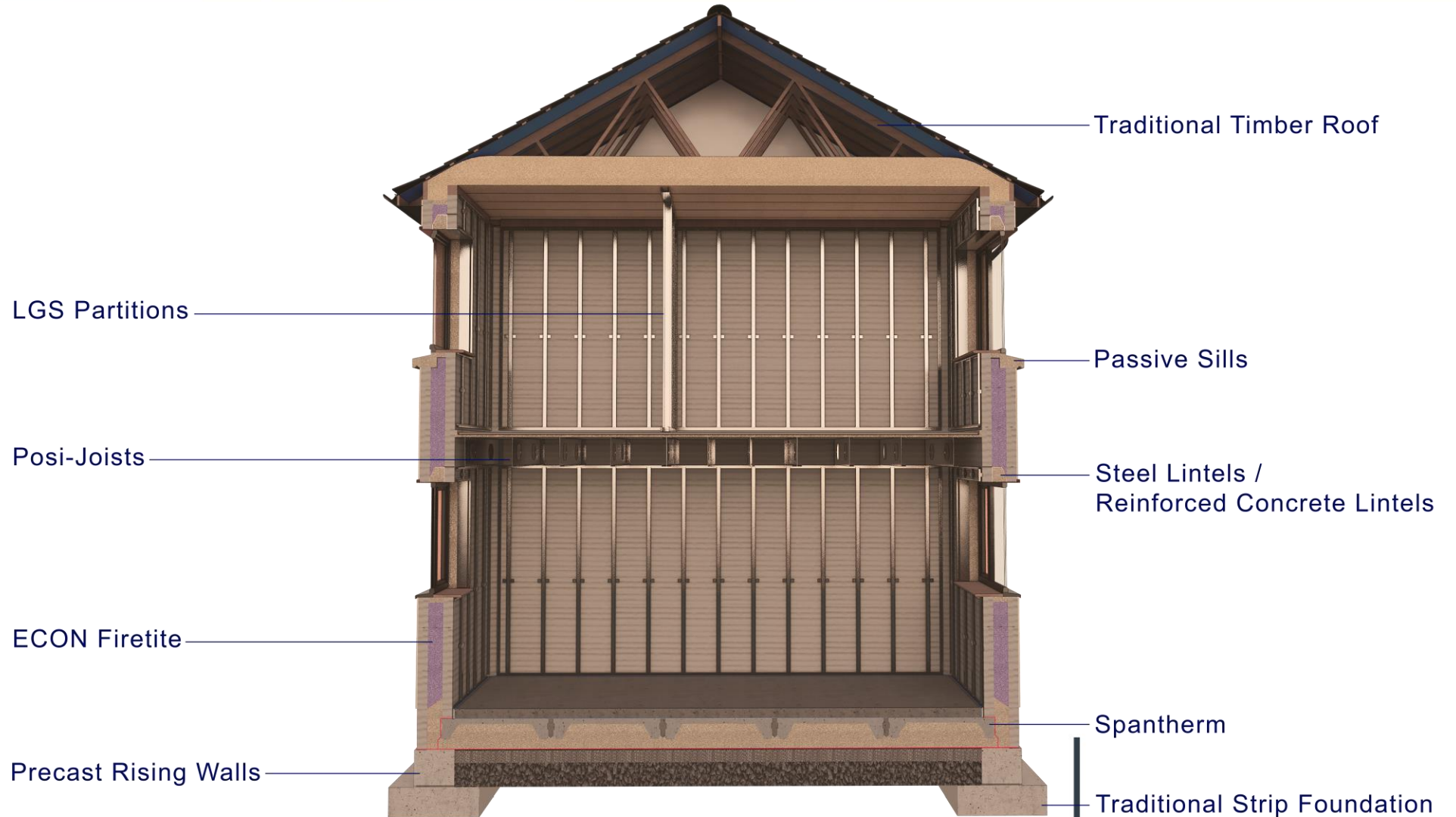




Phase	Start	Finish	Volume (m <sup>3</sup> )
Phase 1	Start: Precast Rising Wall	Finish: DPC	4.14
Phase 2	Start: DPC	Finish: Ground Floor Sills	13.16
Phase 3	Start: Ground Floor Sills	Finish: Ground Floor Lintels	13.74
Phase 4	Start: Ground Floor Lintels	Finish: Floorplate	9.04
Phase 5	Start: Floorplate	Finish: First Floor Sills	12.05
Phase 6	Start: First Floor Sills	Finish: First Floor Lintels	16.73
Phase 7	Start: First Floor Lintels	Finish: Eaves	2.64
<b>Total Volume</b>			<b>71.5</b>

For the Grange Close Project, the **3DCP printing process** was conducted in **seven sequential phases**. Upon completion of the printing phases, the installation of the building's finishing works commenced led by B&C Building Contractors.

## DESIGN: Eurocode 6



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Thank you for your time  
and contributions