B&K STRUCTURES

OPTIMISED OFFSITE SOLUTIONS

Optimised Building Solutions

Andrew Goodwin

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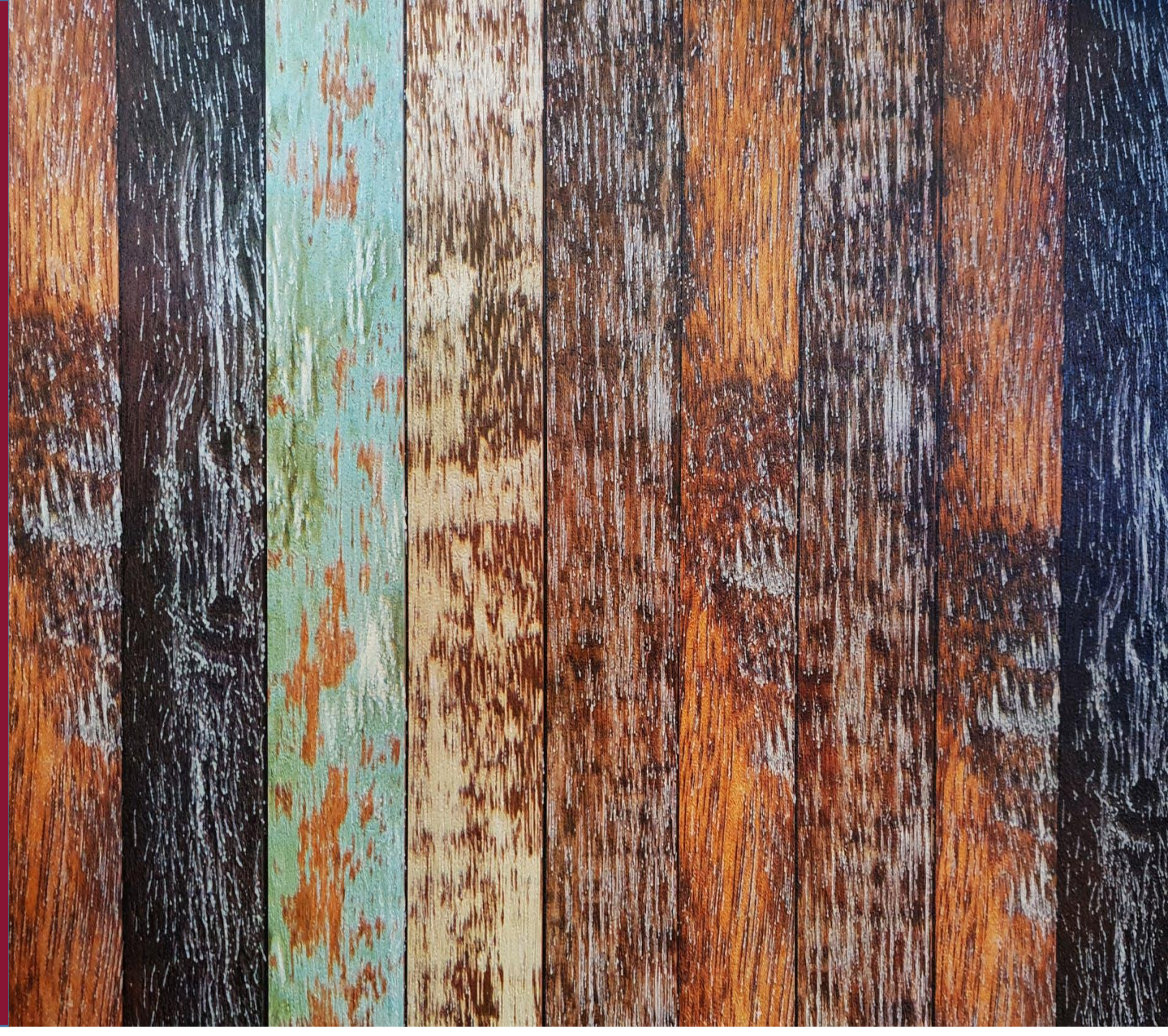
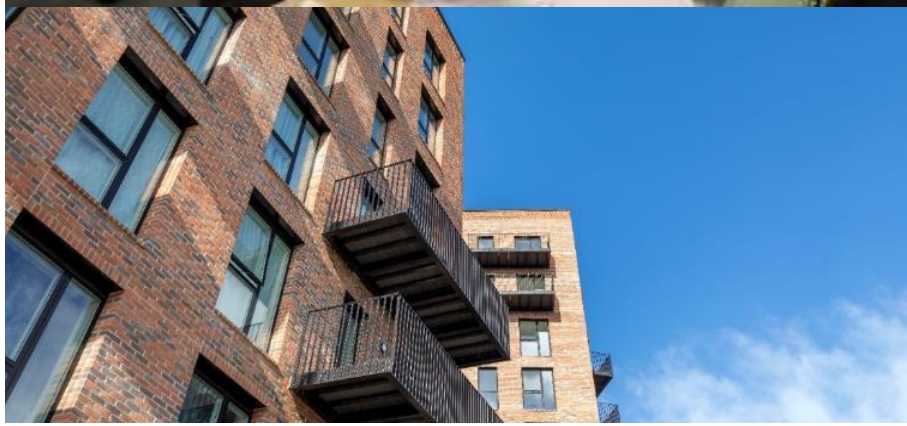


About B&K Structures

- Over 40 years experience
- Anticipated turnover of £26m for 2018/19
- Forecast turnover of £30m for 2019/20
- Part of the Bowmer & Kirkland Group
  - Financially robust
- Employing over 50 dedicated staff:
  - Structural Engineers
  - CAD technicians (BIM level 2 Accredited).
  - Project Managers.
  - Site Management & Engineering.
  - H&S Manager & Supervisors
  - QA & Environmental Management

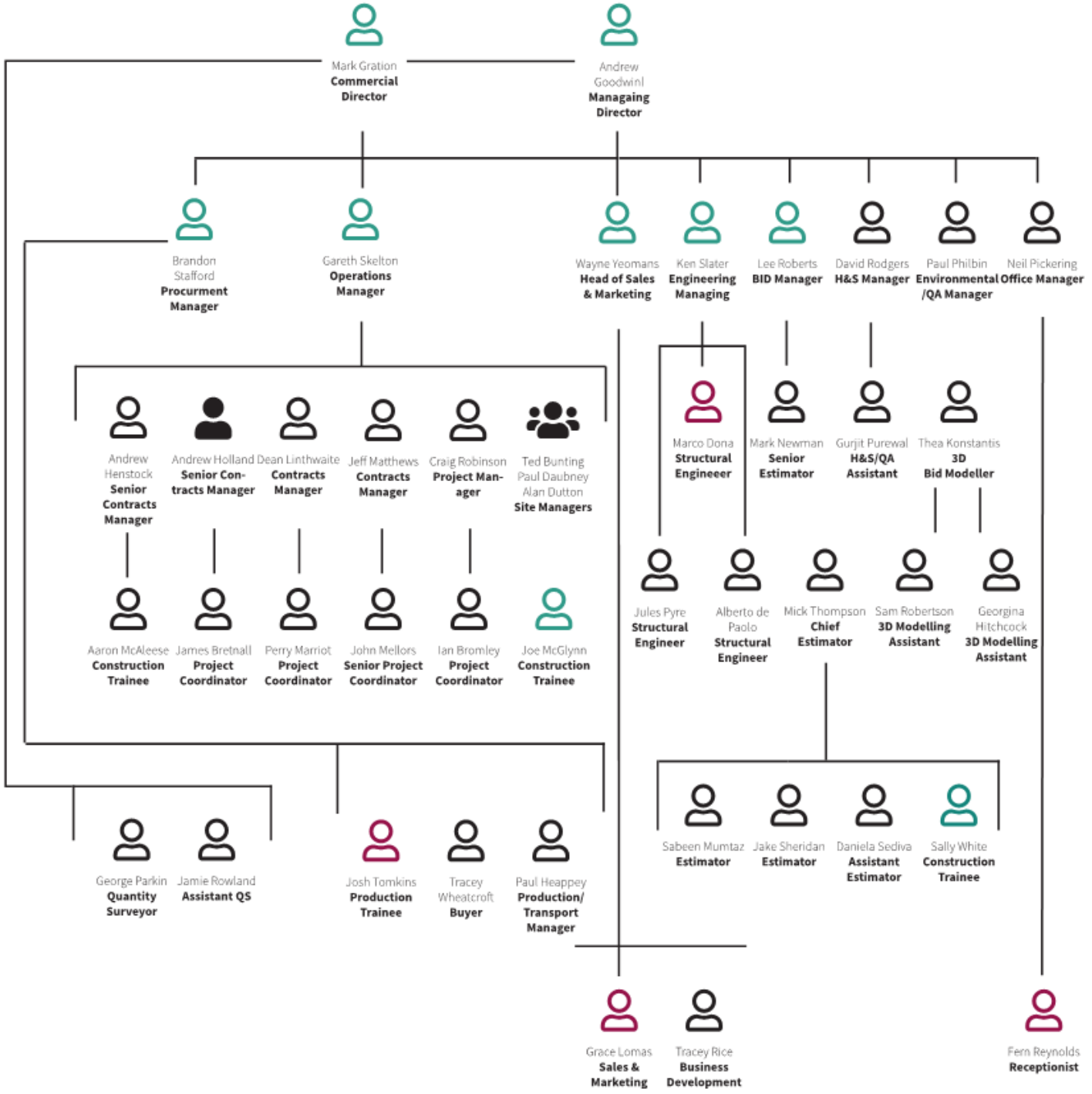
A complete design and build service



Organogram.....

Andrew Goodwin
Managing Director

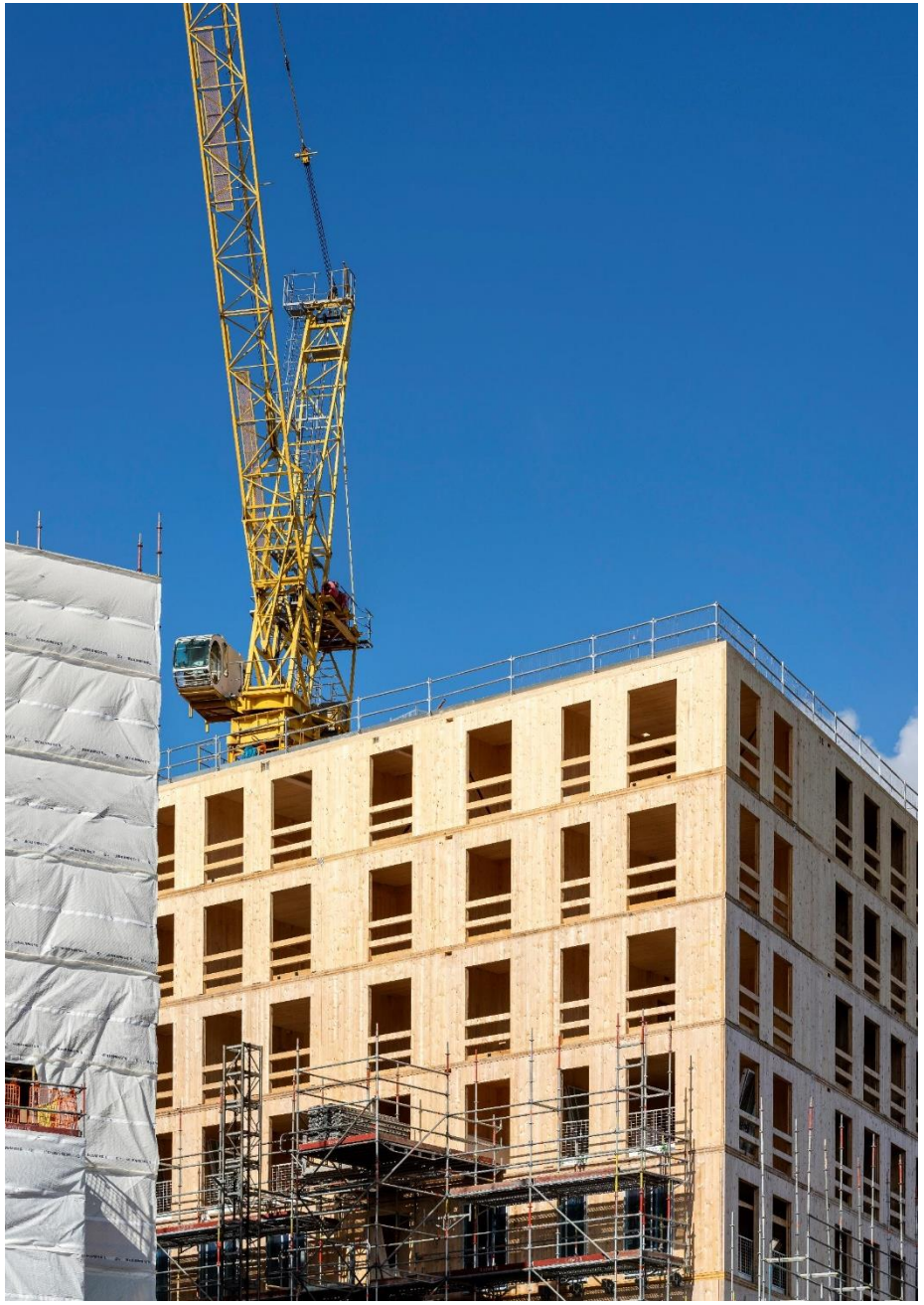
Mark Gration
Commercial Director



Core Products

CLT (Cross Laminated Timber)

Dalston Lane, Hackney



CLT (Cross Laminated Timber)

Dalston Lane, Hackney

Glulam

SKY BiiB 25th Anniversary Building

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Structural Steelwork

St. Mary Magdalene School, London

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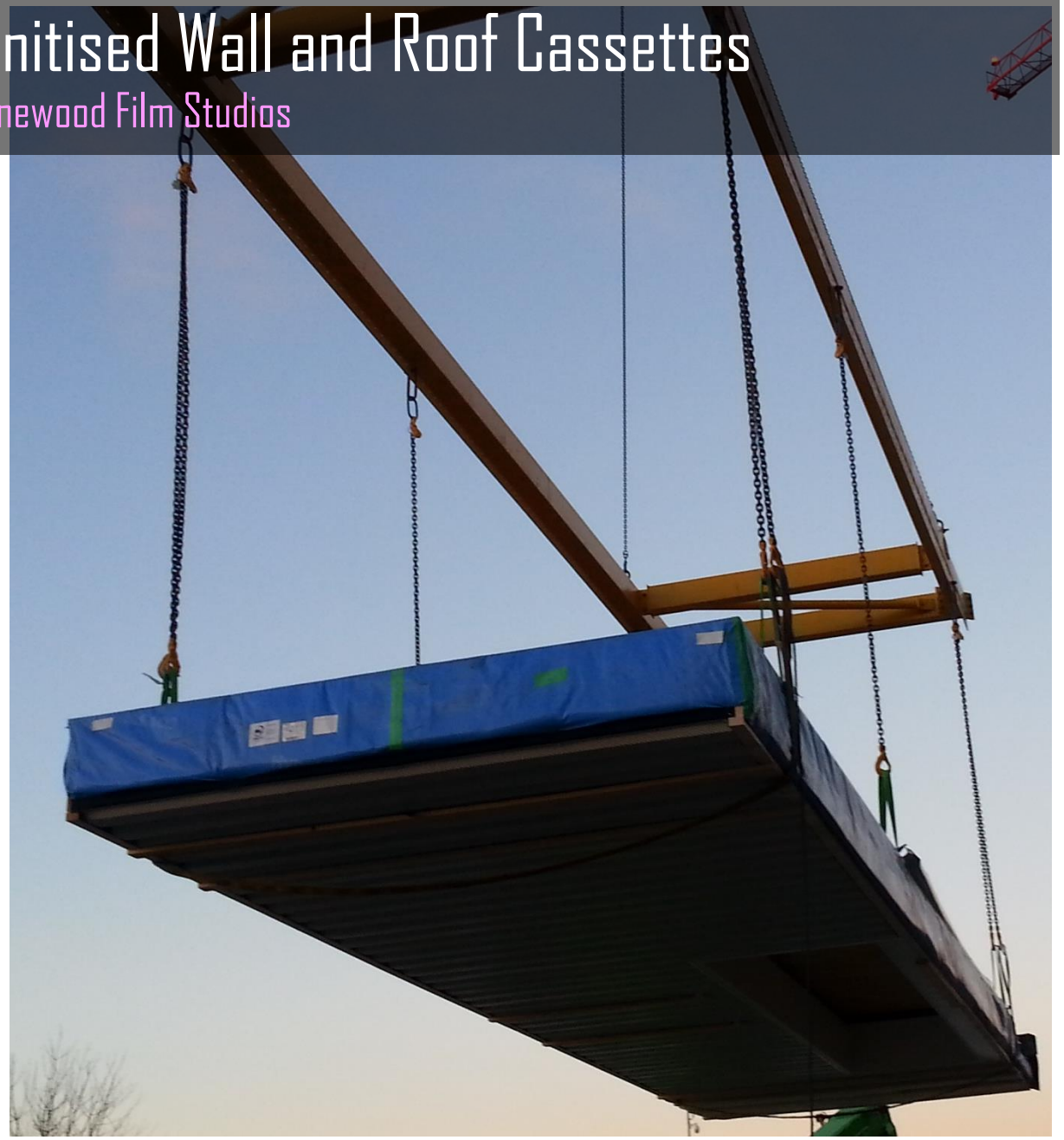
St. Mary Magdalene School, London

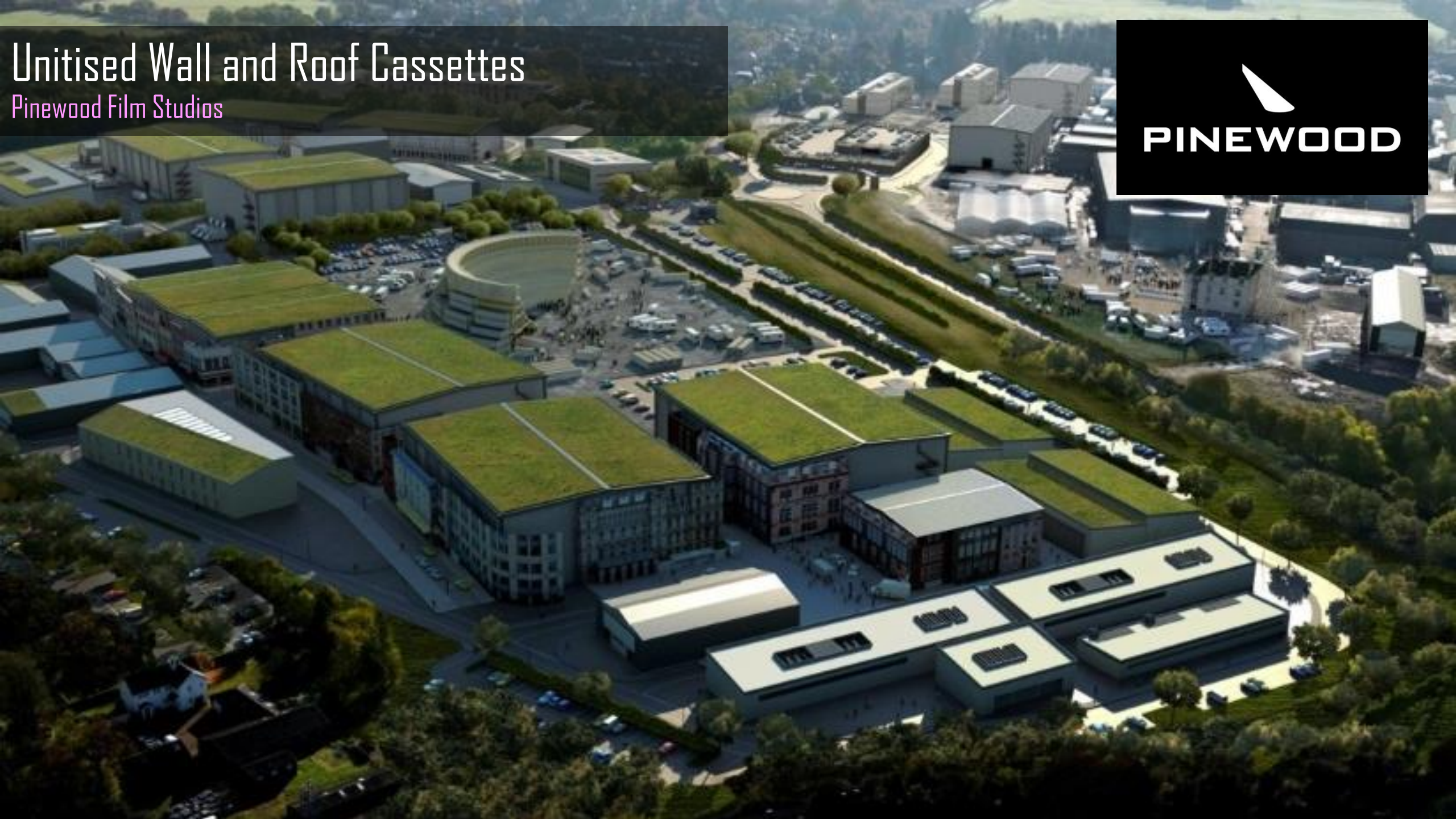
Unitised Wall and Roof Cassettes

Pinewood Film Studios



Unitised Wall and Roof Cassettes

Pinewood Film Studios



‘Hybrid’ Solutions.....

this scheme showcases Steel and CLT

Market Sectors.....

Residential
(Medium to High Rise)

Commercial

Education

Sports & Leisure

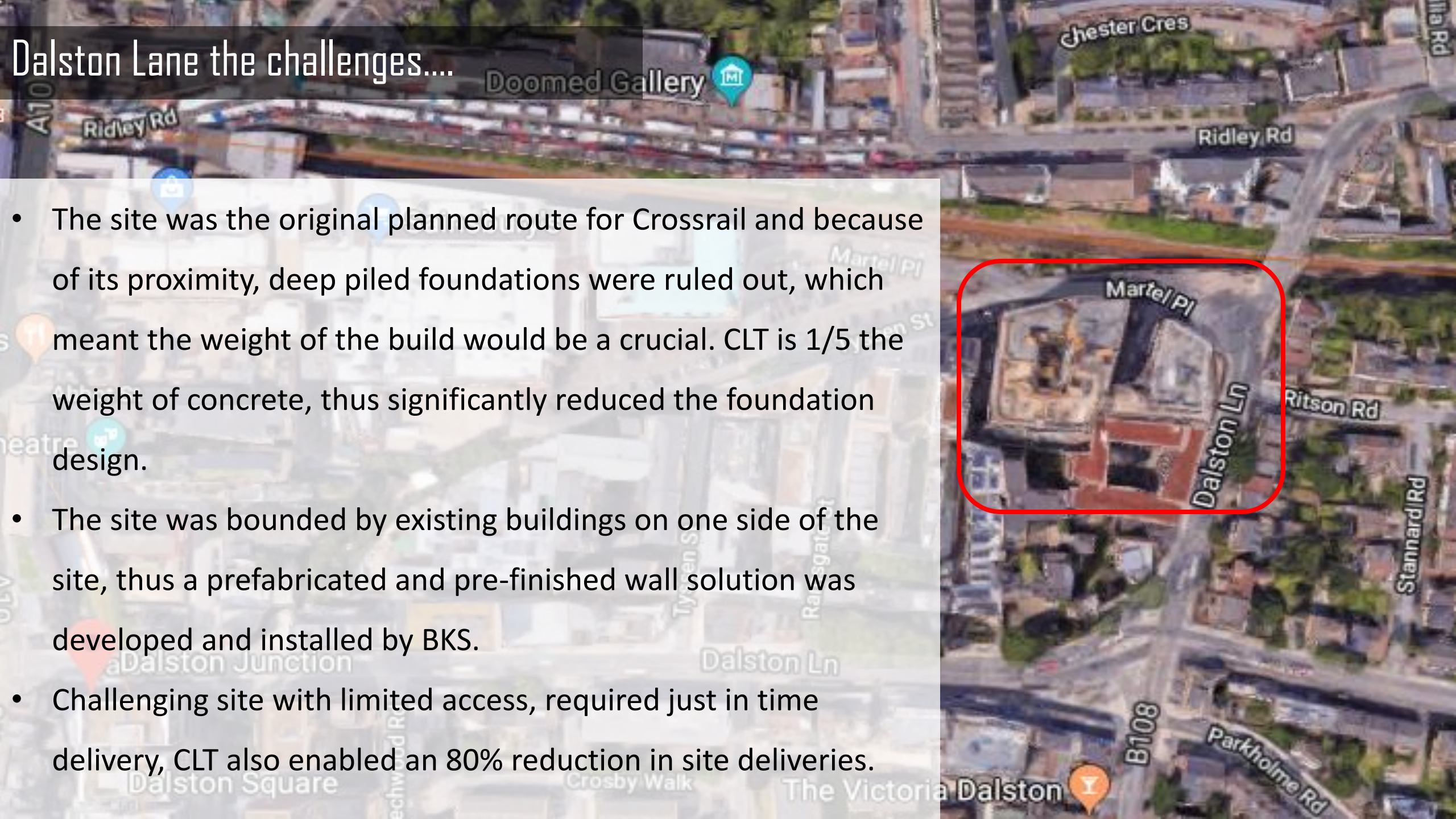
Infrastructure

Retail

CLT in Residential Builds – Dalston Lane

Dalston Lane the challenges....

- The site was the original planned route for Crossrail and because of its proximity, deep piled foundations were ruled out, which meant the weight of the build would be a crucial. CLT is 1/5 the weight of concrete, thus significantly reduced the foundation design.
- The site was bounded by existing buildings on one side of the site, thus a prefabricated and pre-finished wall solution was developed and installed by BKS.
- Challenging site with limited access, required just in time delivery, CLT also enabled an 80% reduction in site deliveries.



Original Concept....RC

10,700 TONNES OF CONCRETE

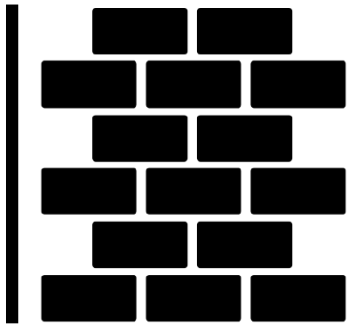
- Original design intent was an RC frame throughout, and included 700 tonnes of rebar reinforcement

Mass Timber Choice.....

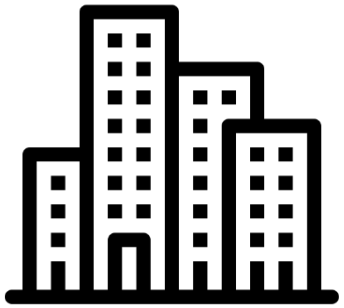
2,300 TONNES OF CLT / RC HYBRID

- RC Frame from basement to first floor
- CLT utilised for all upper floors
- Significant benefit to foundation design

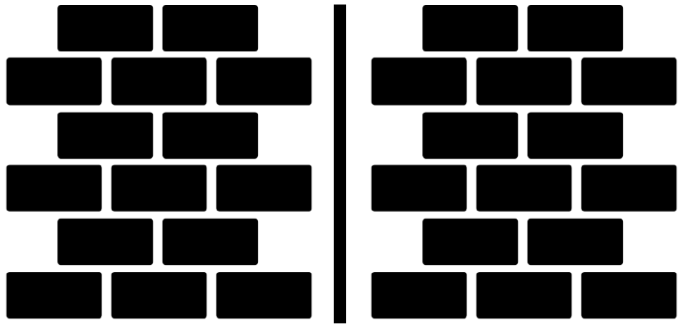
CLT Components



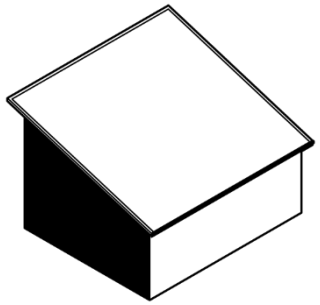
LOAD-BEARING INNER SKIN OF AN EXTERNAL WALL



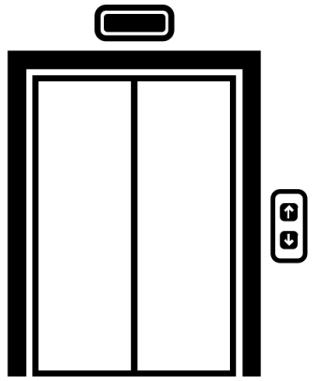
UPPER FLOORS FOR MULTI-STOREY



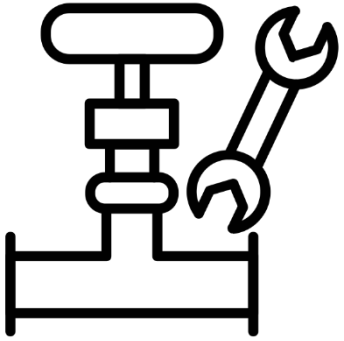
Pparty walls



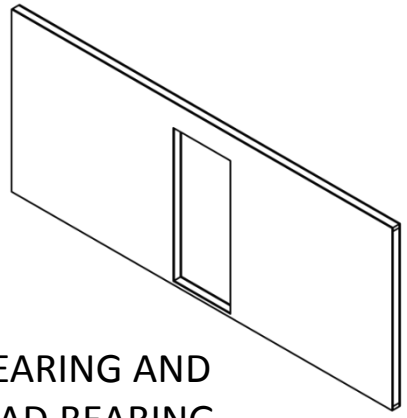
STRUCTURAL ROOF ELEMENTS



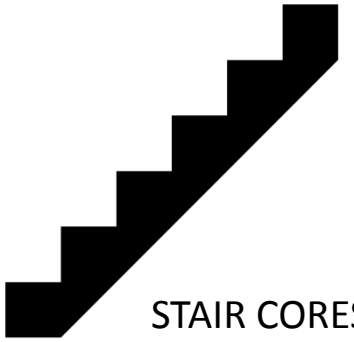
LIFT SHAFTS



RISER SHAFTS



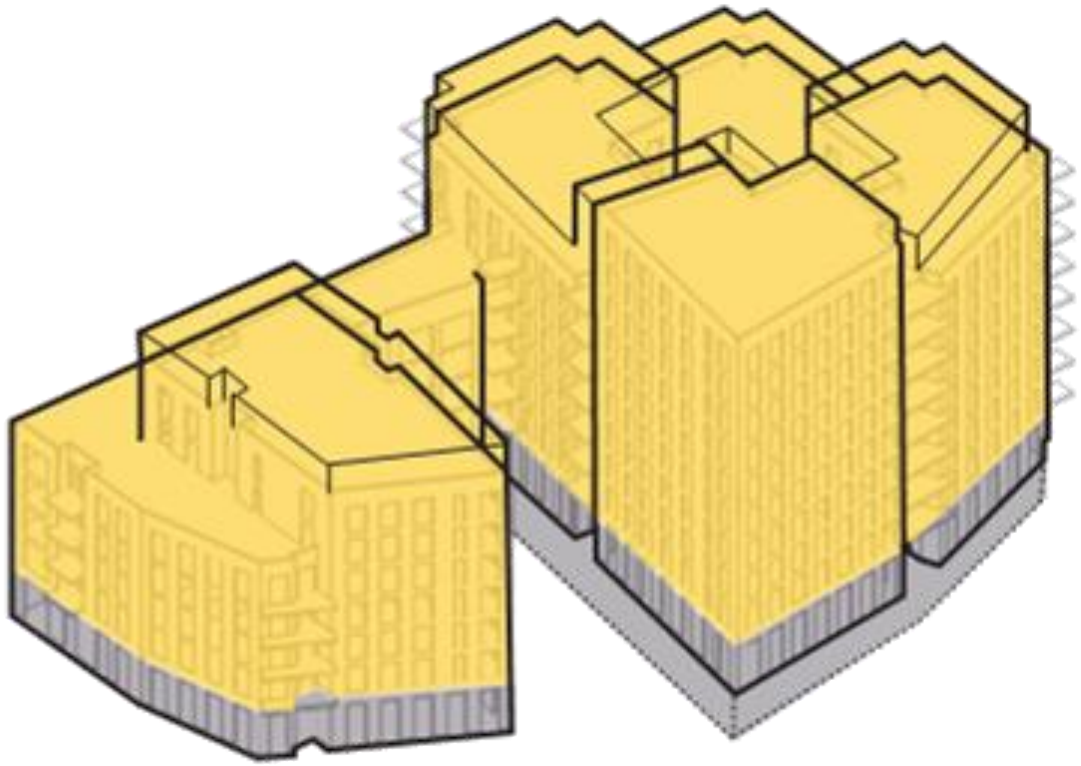
LOAD BEARING AND NON-LOAD BEARING INTERNAL WALLS



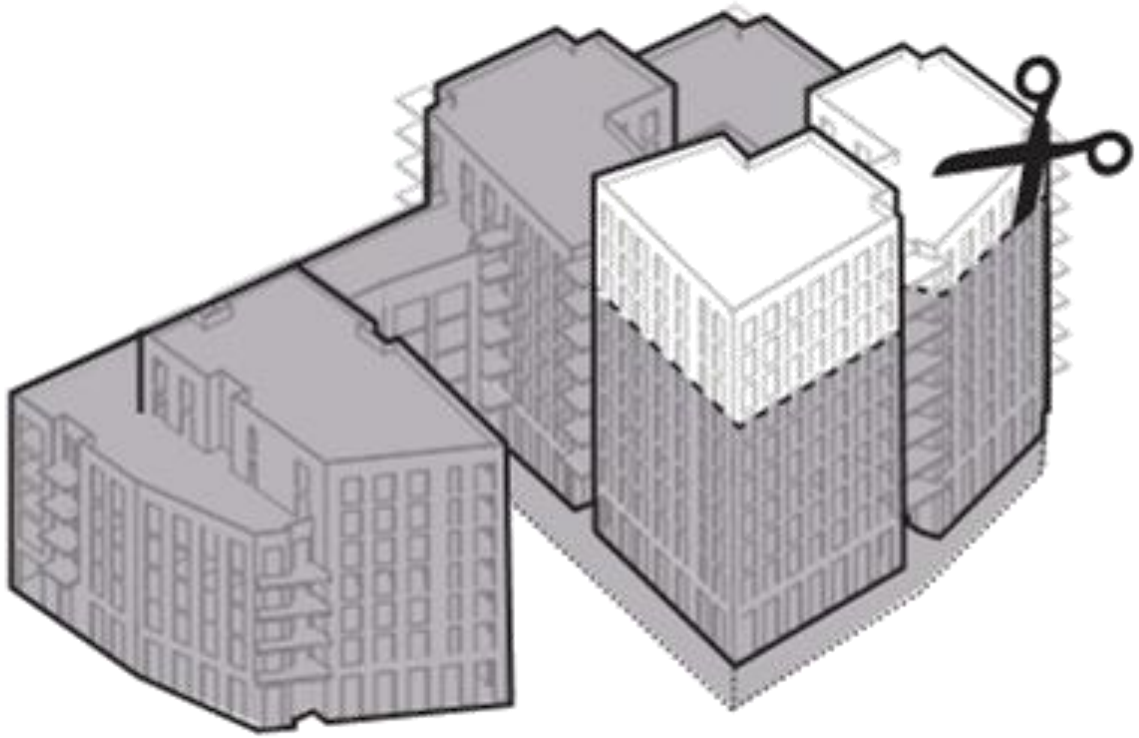
STAIR CORES AND STAIRCASES

How CLT has been utilised.....

35% more units achievable compared to original RC frame design



141 FLATS =



106 FLATS =

Things to consider..... Fire

Fire

Things to consider..... Fire

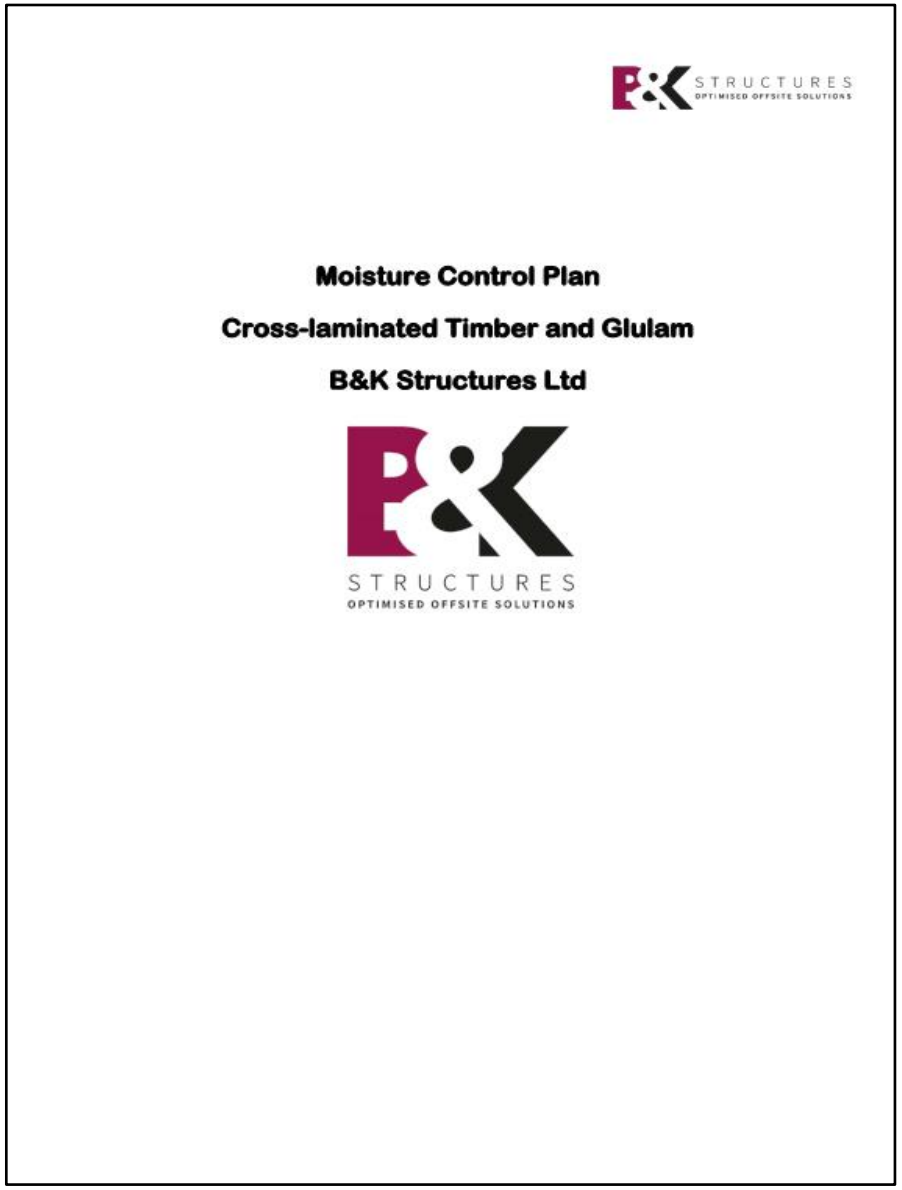
- Compliance with the building regulations under fire is the same as for any product and is fulfilled by the guidance contained within AD-B.
- CLT is designed for fire in accordance with Eurocode 5, it is predictable in fire and has clearly defined charring rates determined through testing.
- CLT has a range of fire resistance and load testing that complies with EN 1363, 1364 & 1365.
- BKS undertake a project specific fire risk assessment, through a dedicated fire Engineer.

Things to consider..... Durability

Moisture

Checks and Maintenance

Things to consider..... Durability



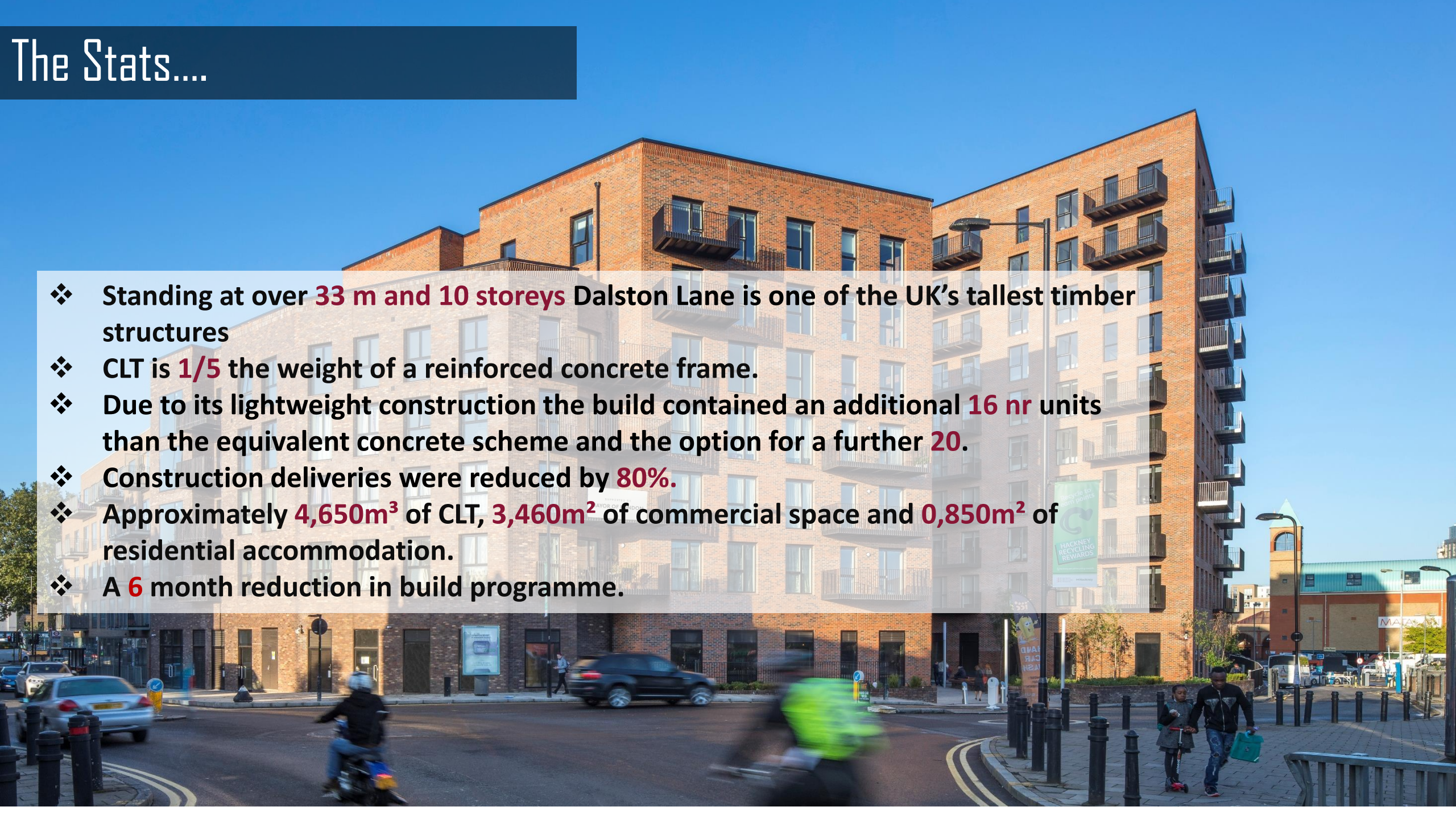
As a business we are now offering:

a) Moisture surveys and inspections up to project PC.

b) Assist the main contractors in the development of their project specific Moisture control procedure, beyond sectional handover by BKS.

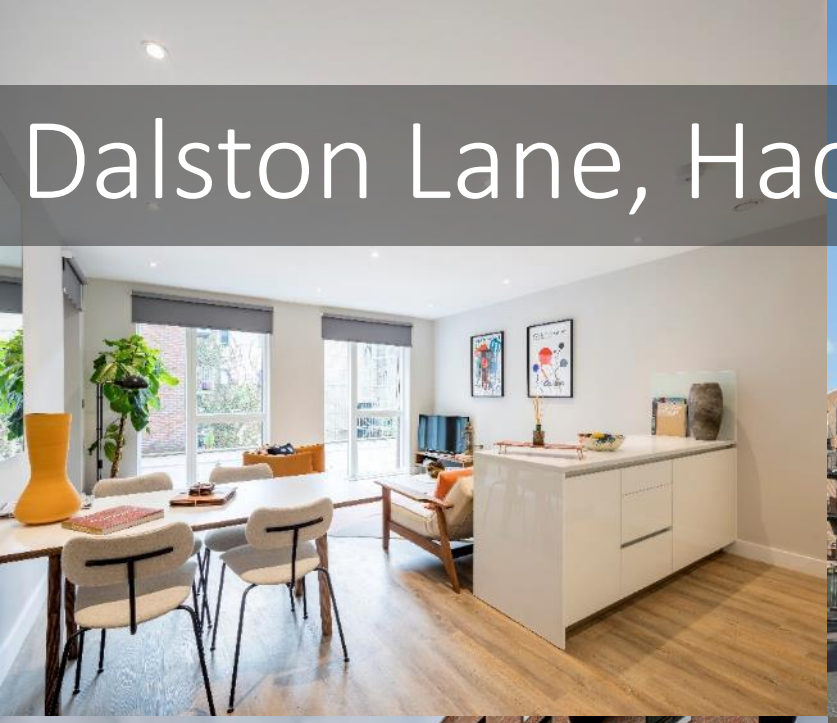
c) The option (subject to a fee) to undertake surveys/inspections as part of the final operation and maintenance of the building.

The Stats....



- Standing at over 33 m and 10 storeys Dalston Lane is one of the UK's tallest timber structures
- CLT is 1/5 the weight of a reinforced concrete frame.
- Due to its lightweight construction the build contained an additional 16 nr units than the equivalent concrete scheme and the option for a further 20.
- Construction deliveries were reduced by 80%.
- Approximately 4,650m^3 of CLT, 3,460m^2 of commercial space and 0,850m^2 of residential accommodation.
- A 6 month reduction in build programme.

Dalston Lane, Hackney



a few more stats.....

The correct choice of construction materials and techniques is crucial if the UK is to meet its target of a 34% reduction in CO2 emissions by 2020.

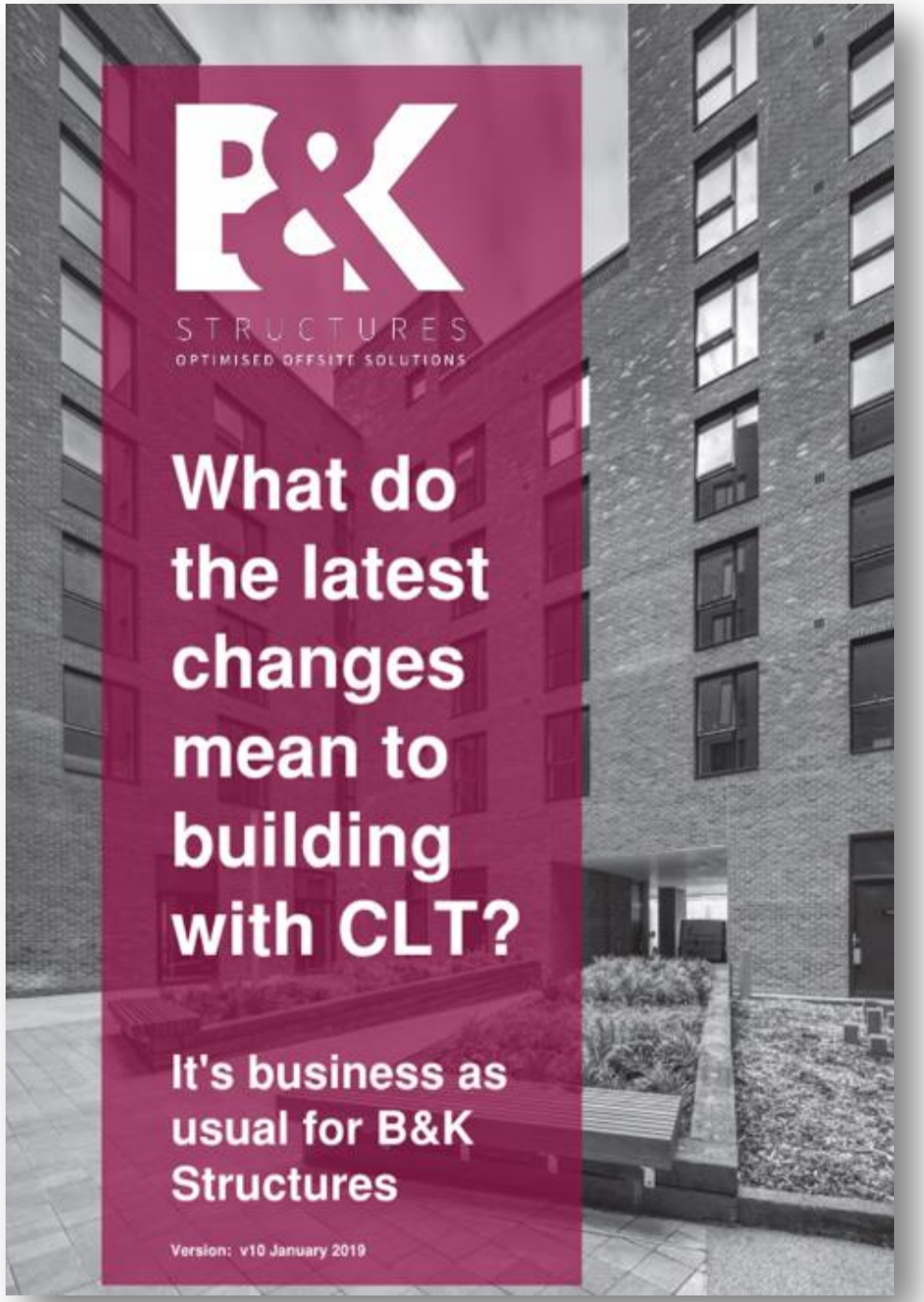
Co2 saving could mean that every resident in this development could run a car for 14 years without producing any emissions !

	CLT Scheme	Equivalent concrete frame (Estimated)
Volume Timber used	4649m³	n/a
Number of trees	2325	n/a
Equivalent area of forest	9200m³	n/a
Time required to grow the equivalent number of trees used in German and Austrian forests	3 hours	n/a
Sequestered carbon*	3576 tonnes $C0^2$	n/a
Embodied carbon*	976 tonnes $C0^2$	2000 tonnes $C0^2$
Net carbon footprint*	-2600 tonnes $C0^2$	+2000 tonnes $C0^2$
Weight of superstructure*	2300 tonnes	10700 tonnes (incl. approx. 700 tonnes of rebar)
Number of deliveries required*	111 lorries	700 lorries
Volume of concrete	6000m³ (foundations, basement to first floor podium only)	6000m³ (foundations, basement to first floor podium) + 4000³ (superstructure above first floor)

*Figures relate to the CLT superstructure only

What do the changes to Building Reg's mean when building with CLT?....

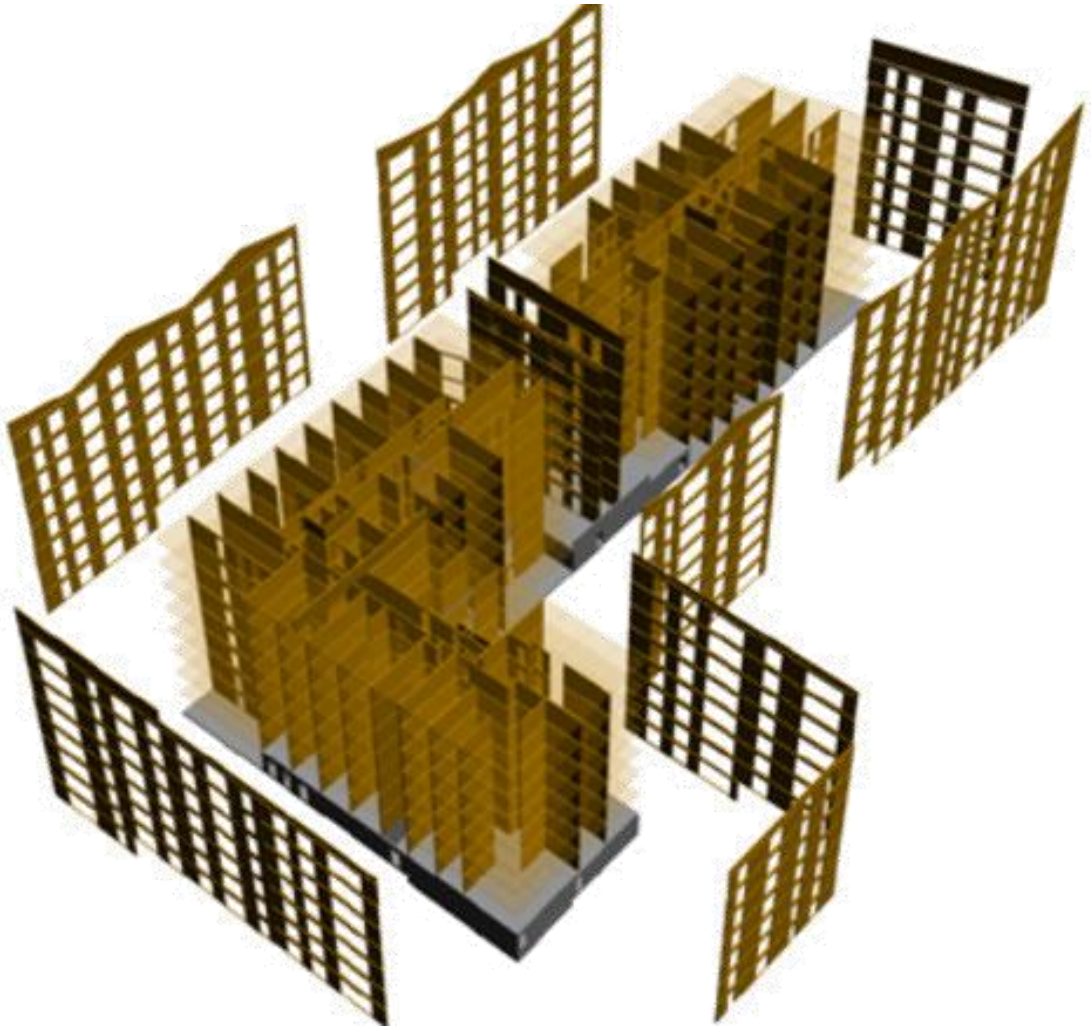
- New regulations came in to force on the 21st December 2018
- Combustible materials banned in the external wall / cladding above 18m on new Residential Buildings or buildings that have a sleeping risk i.e. Care Homes, Student Accommodation, Sheltered housing, Hospitals.
- CLT cannot be used within the external wall line / build up
- CLT can still be used for the structural frame regardless of the height of the building.
- BKS have façade solutions now available for compliance




THINK
OUTSIDE
THE BOX

Building with CLT under the new regulations.....

- **BKS have considered the impact on removing the external / outside CLT wall from the structure**
- **Considered the impact on the design for the structural frame**
- **Consider alternative options:**
  - **SFS through wall system.**
  - **Composite cladding façade solution**
- **SFS system now developed and offered to clients**
- **Further external façade solutions going forward with more off-site elements factory installed (windows, cladding, etc.)**



Building with CLT under the new regulations…..

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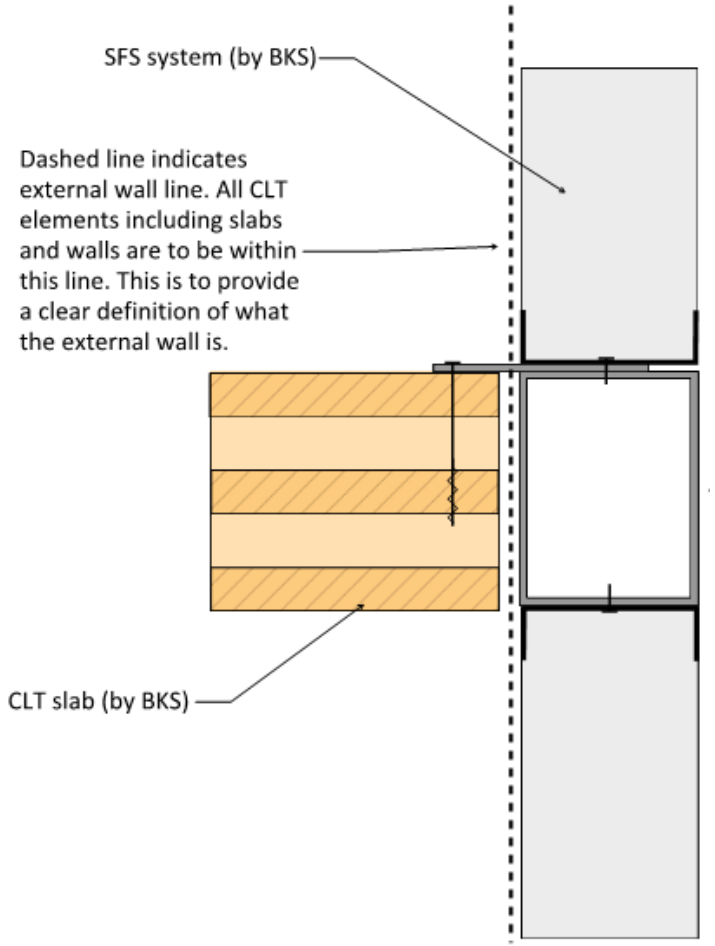
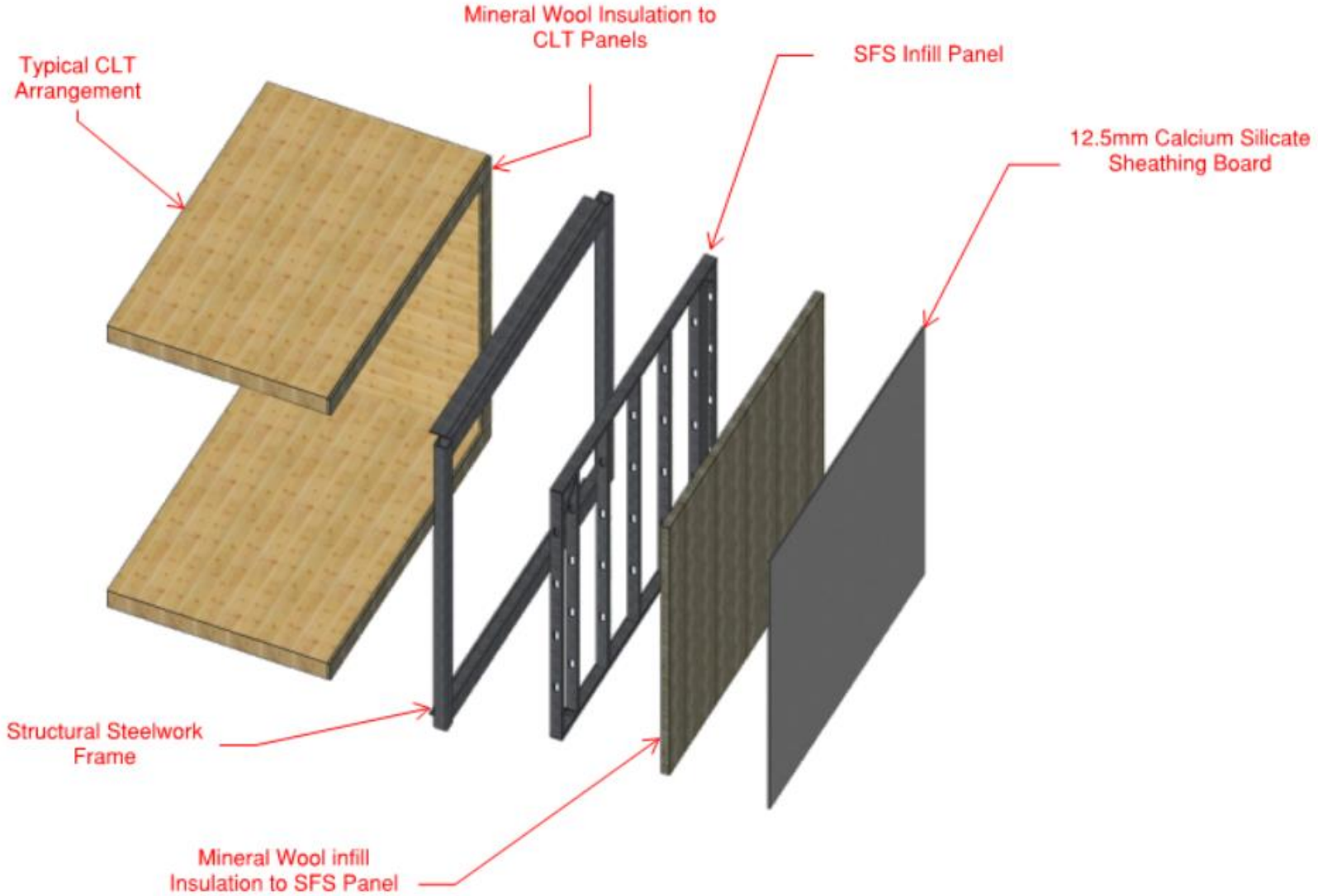
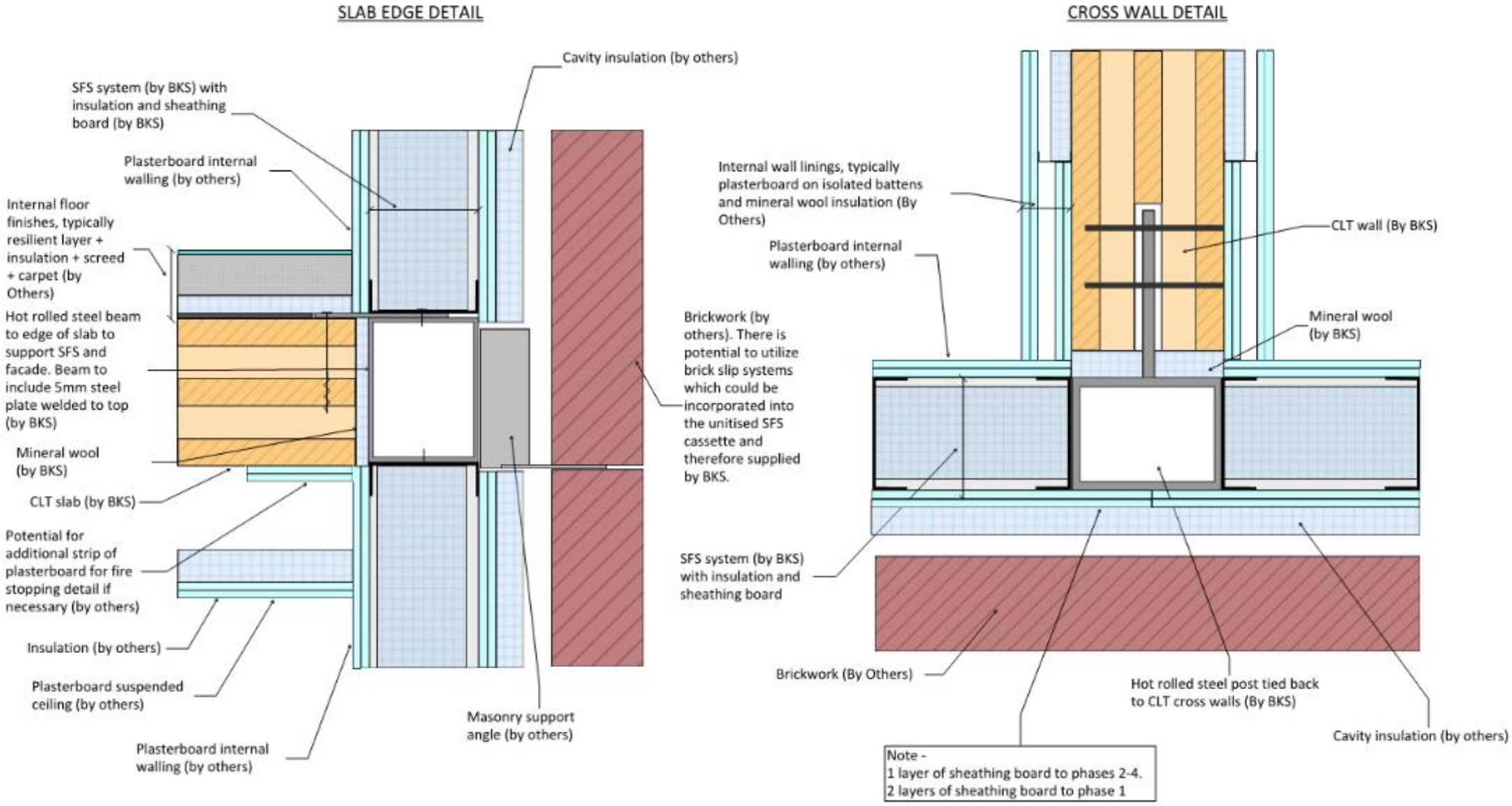




Building with CLT under the new regulations.....



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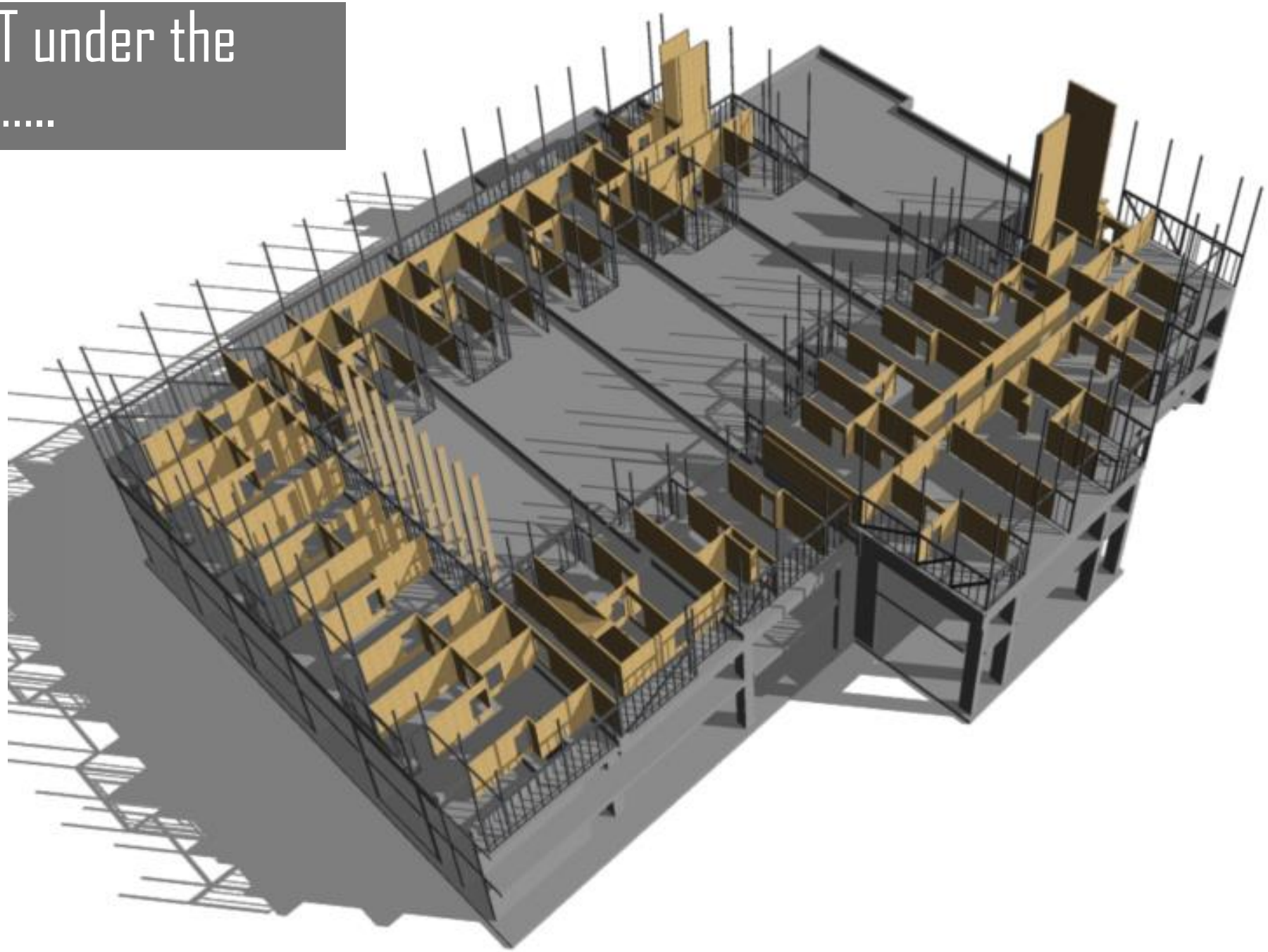

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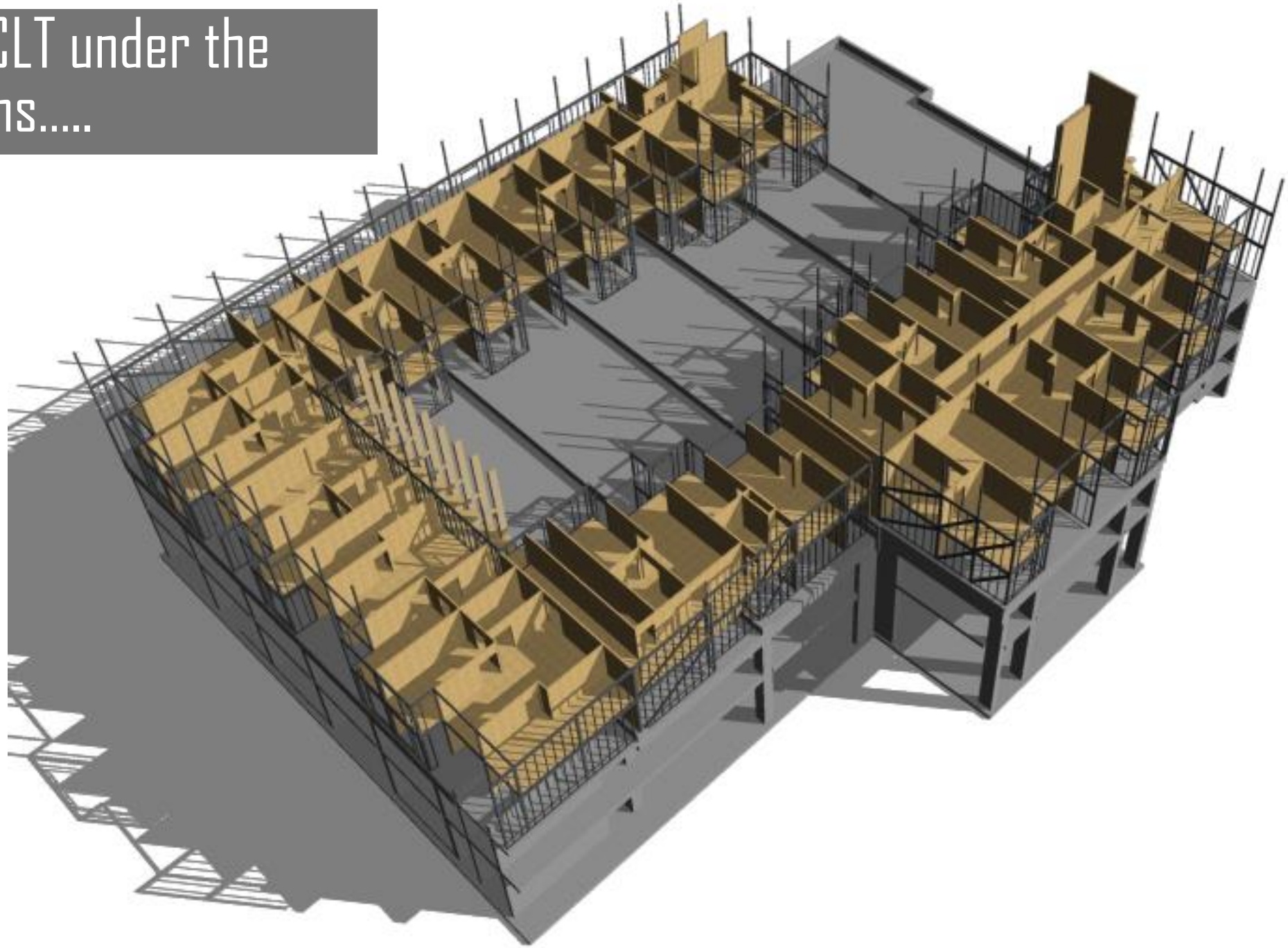

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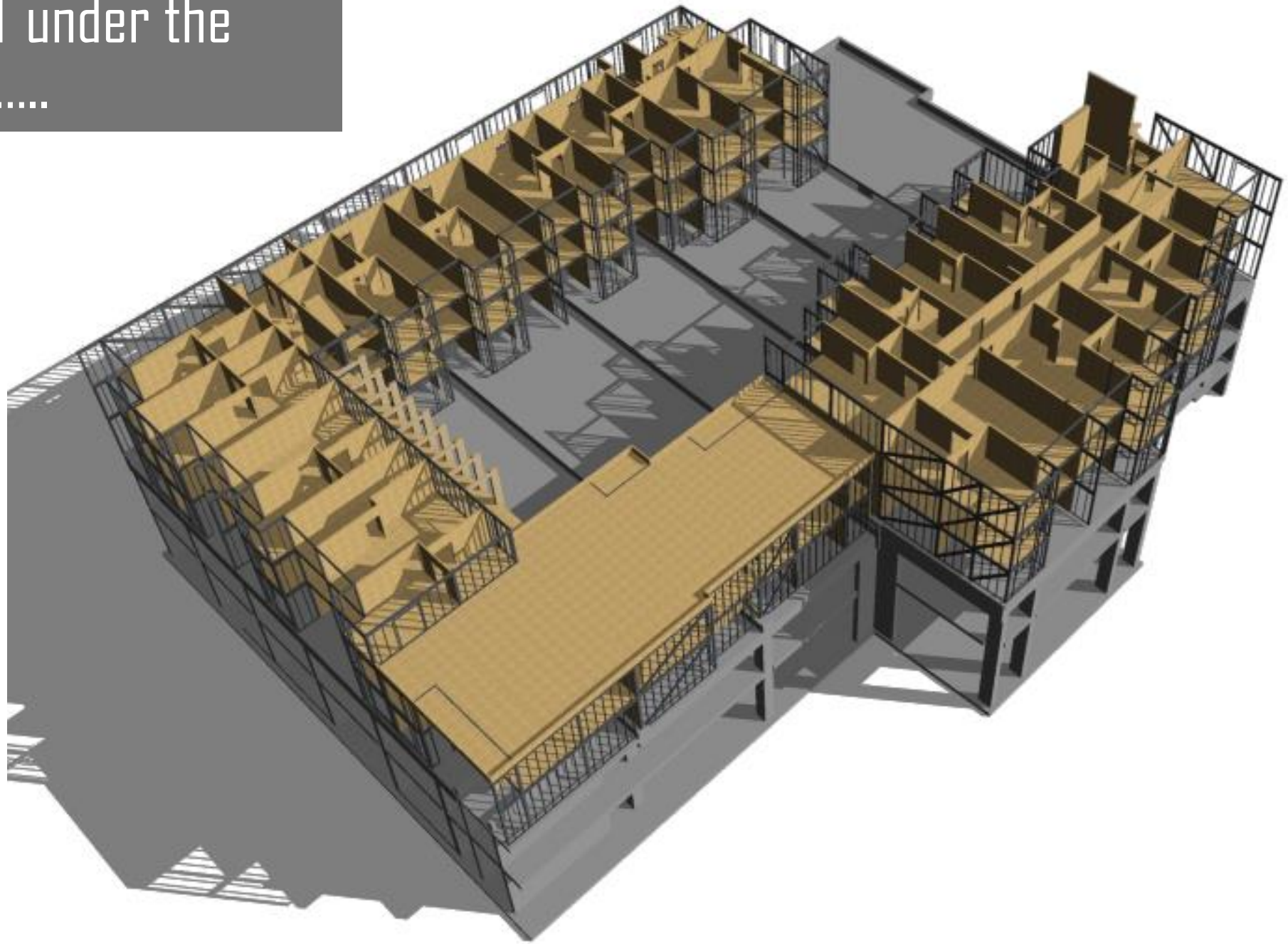

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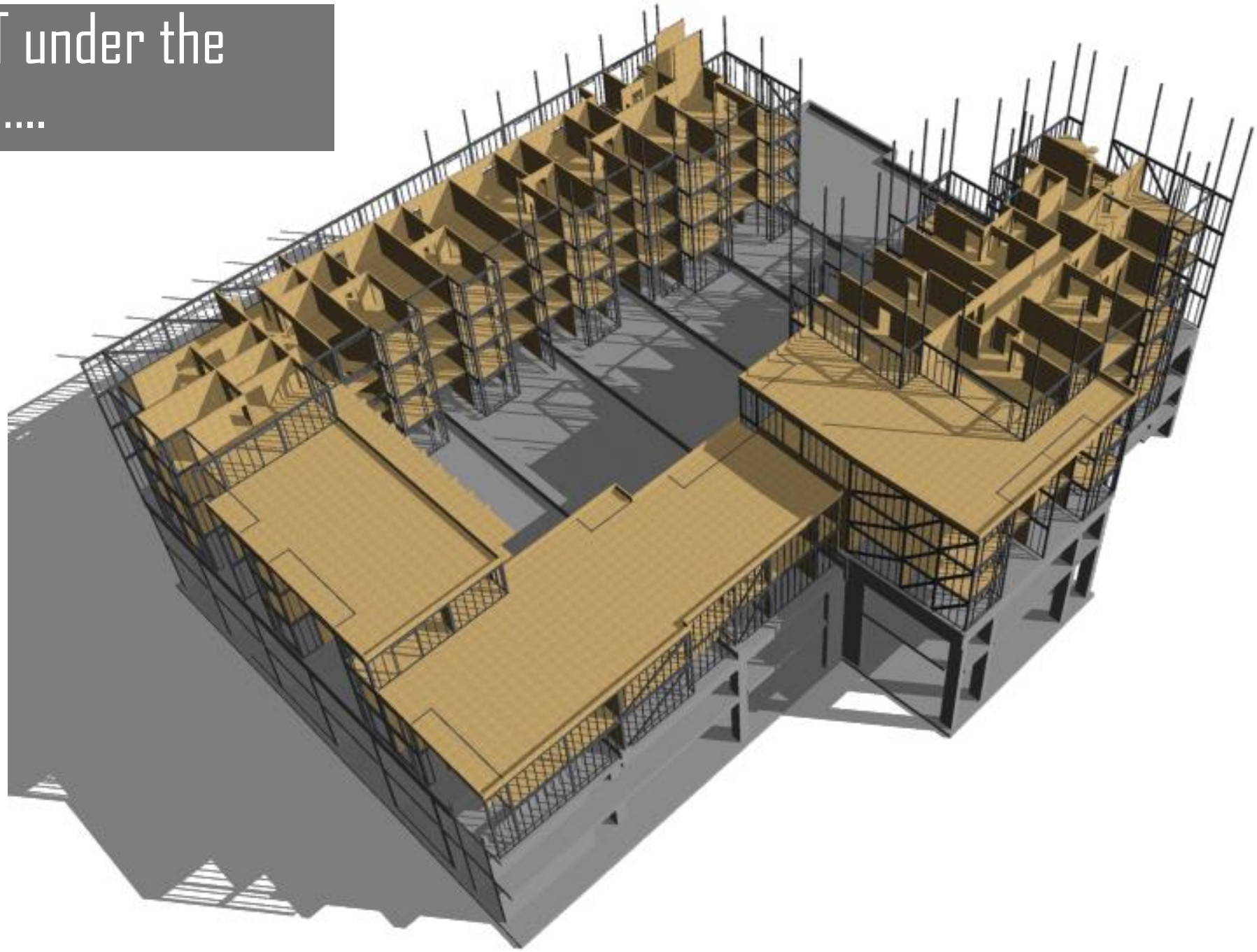

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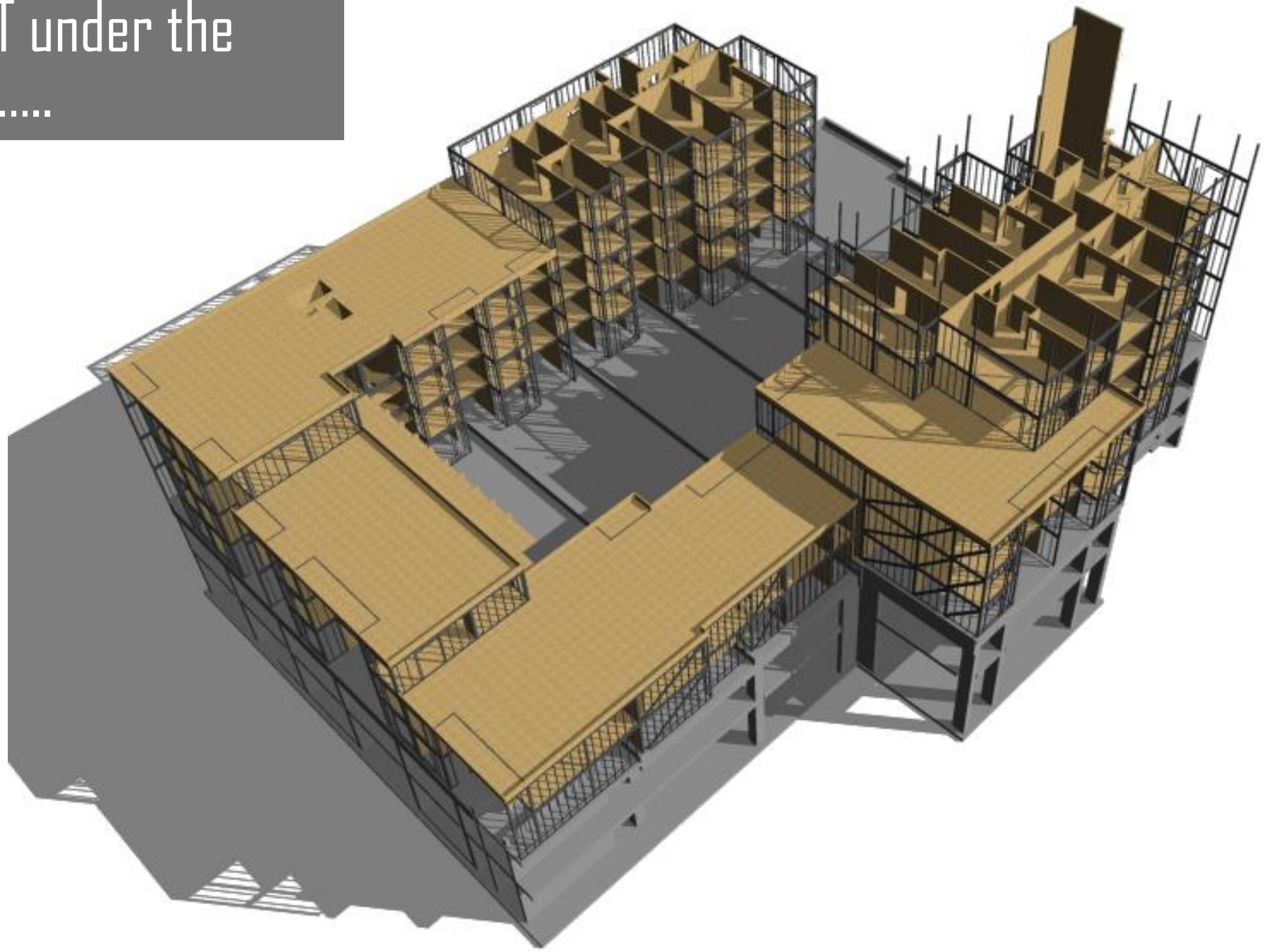

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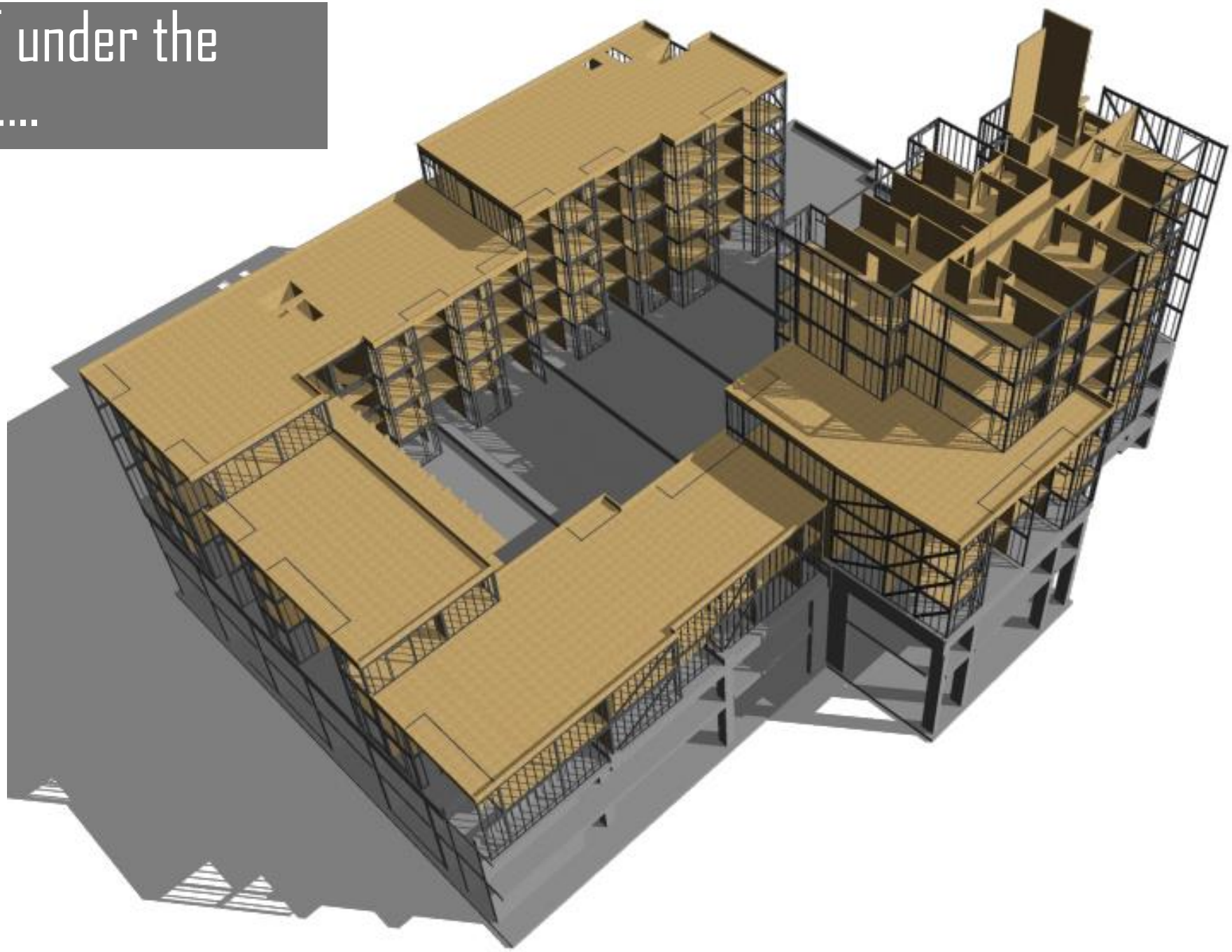

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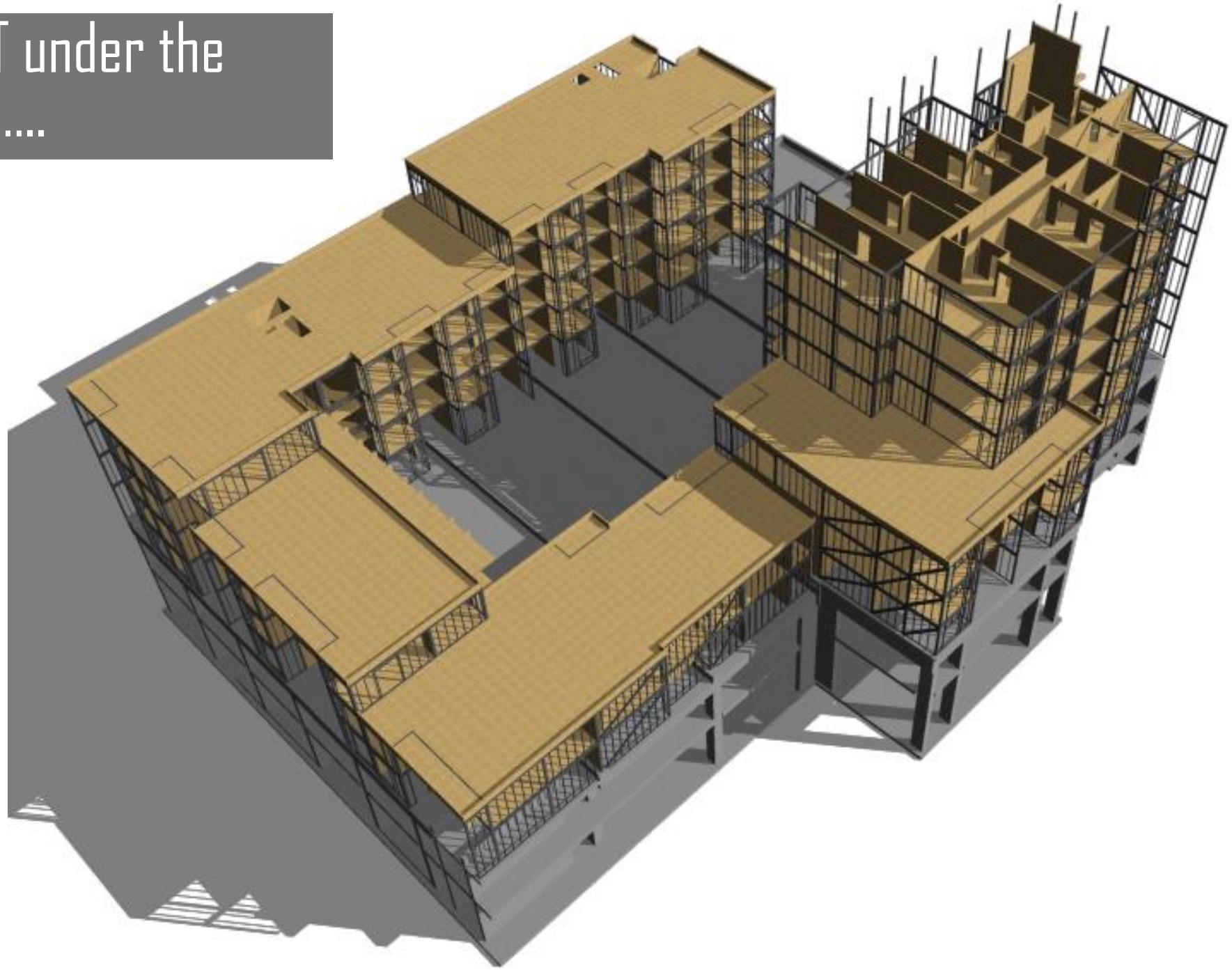

Building with CLT under the new regulations.....

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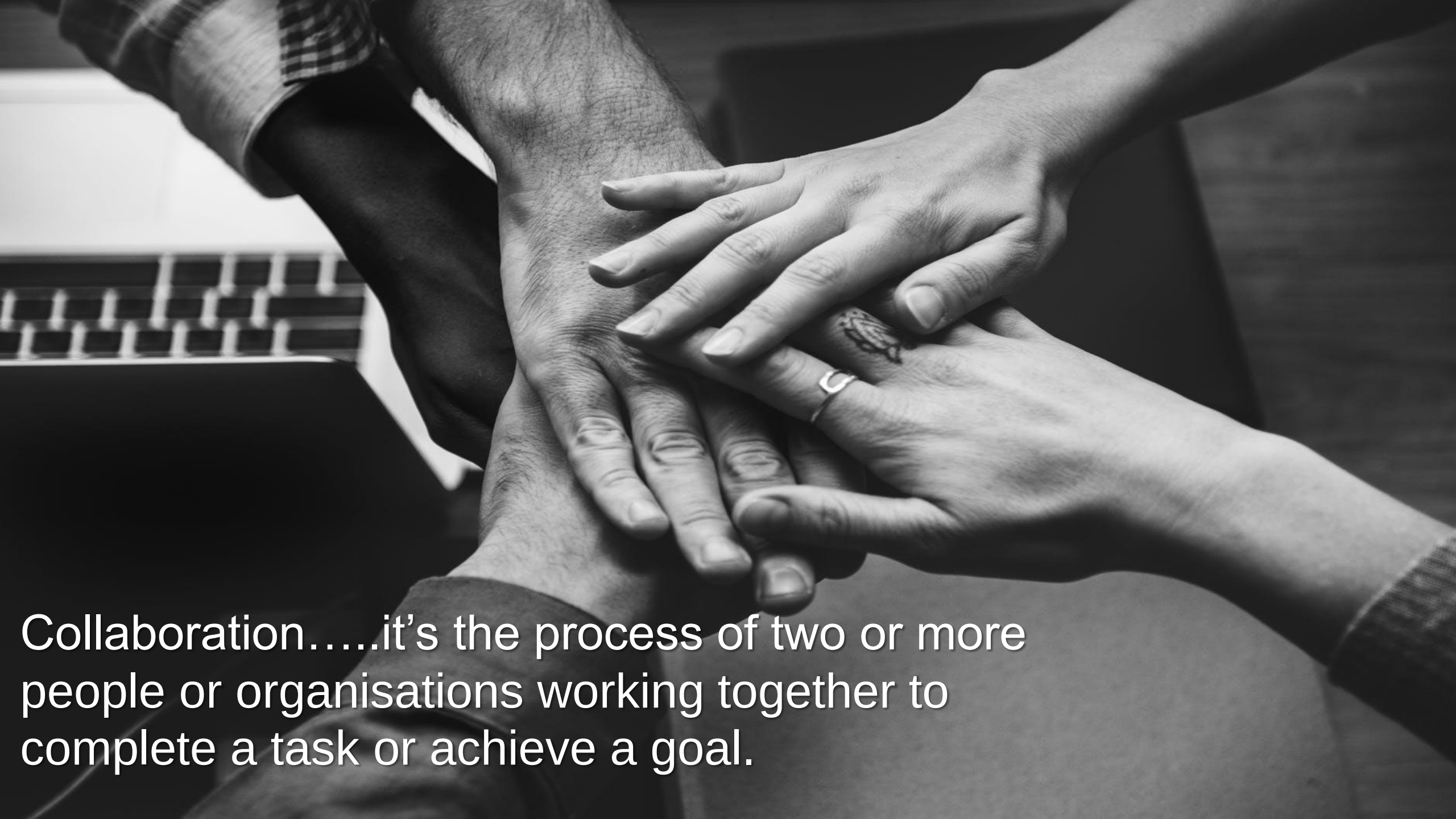
Collaboration…..it’s the process of two or more people or organisations working together to complete a task or achieve a goal.

Accreditation & Trade Associations

The mark of responsible forestry

Thank You
for listening

STRUCTURES

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