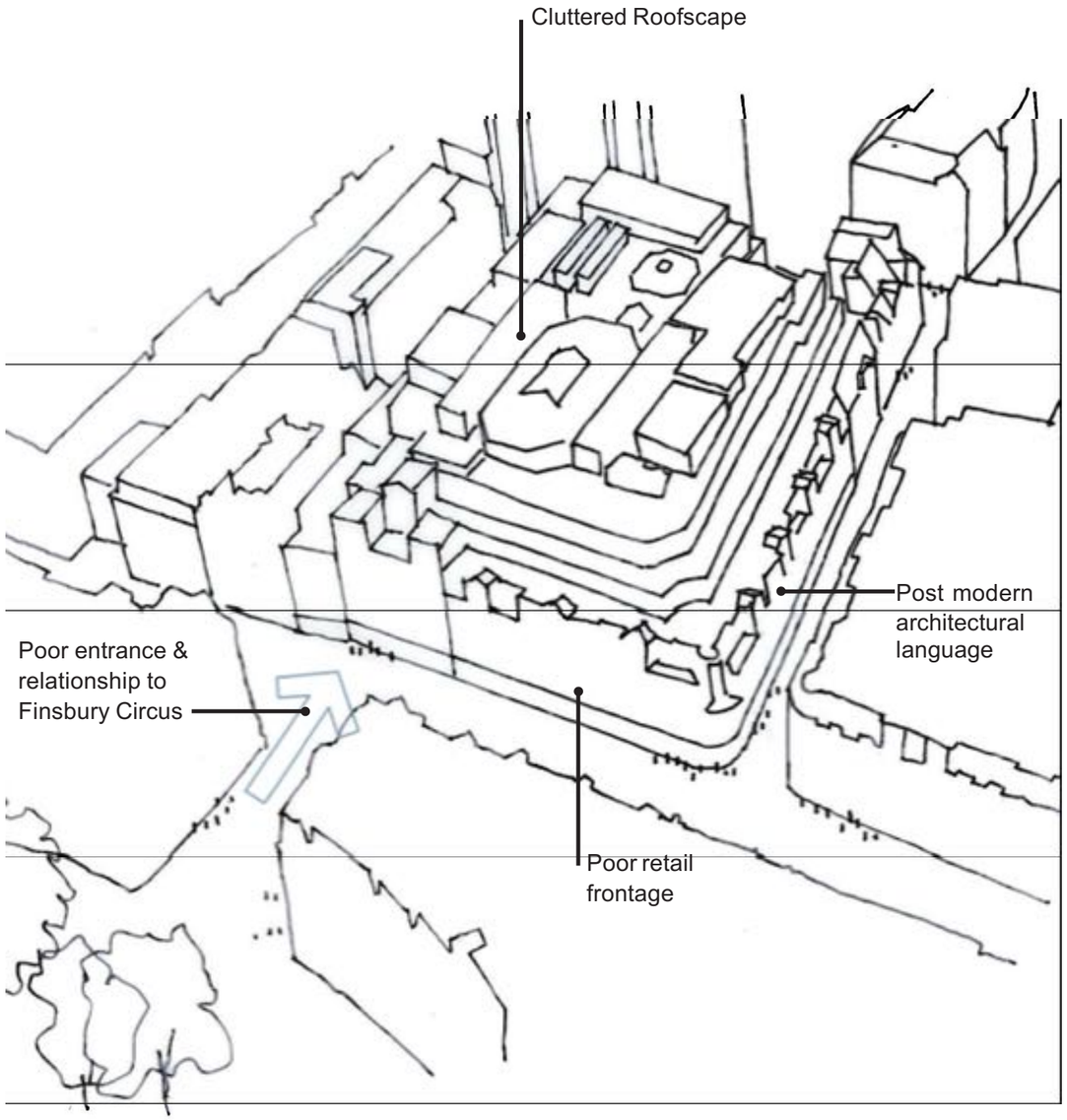
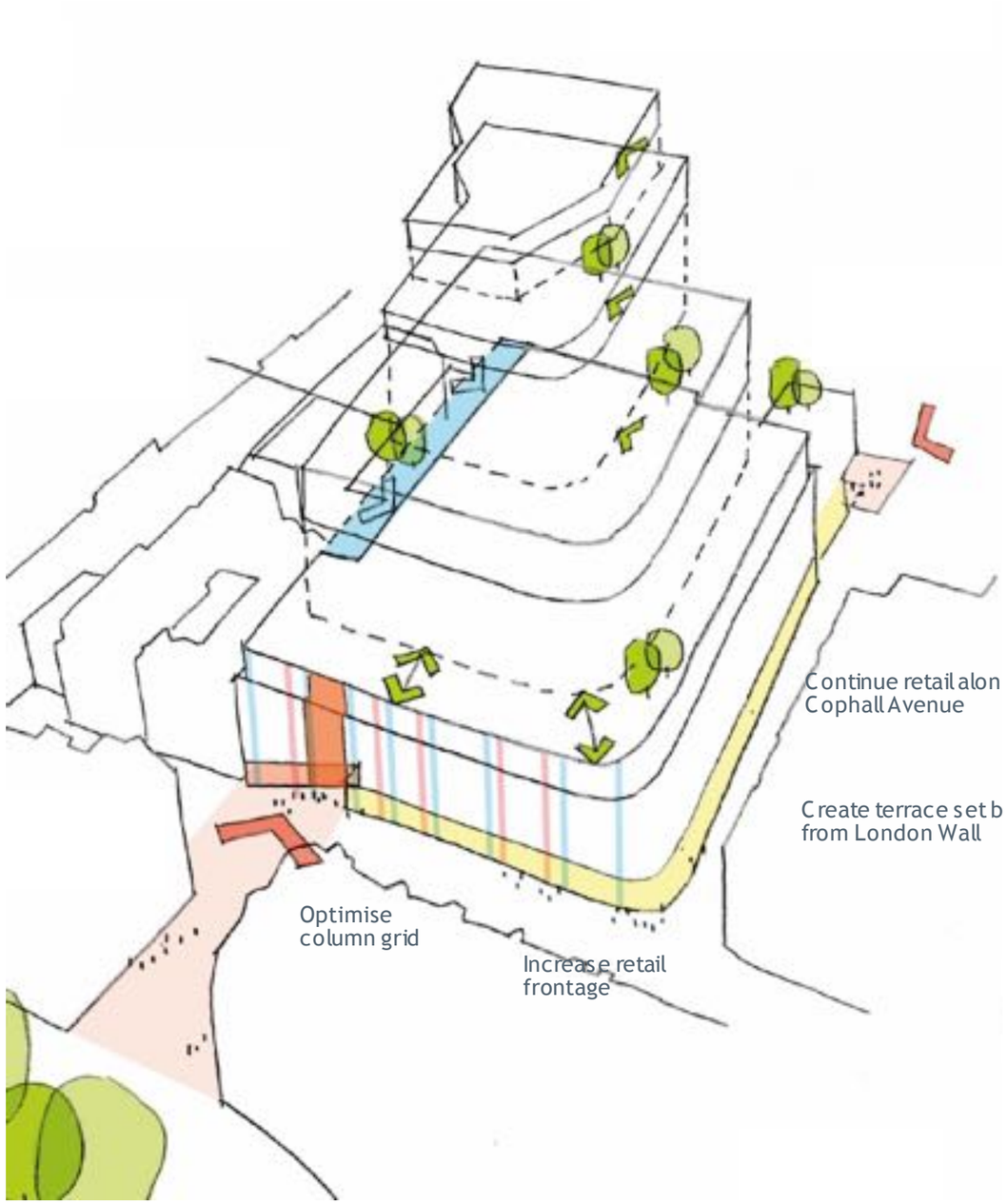
60 London Wall

60 London Wall

Design Response





Design Proposal

Design Proposal

Typical Floor Plan: Before and After

Heavy post-modern facade

Before

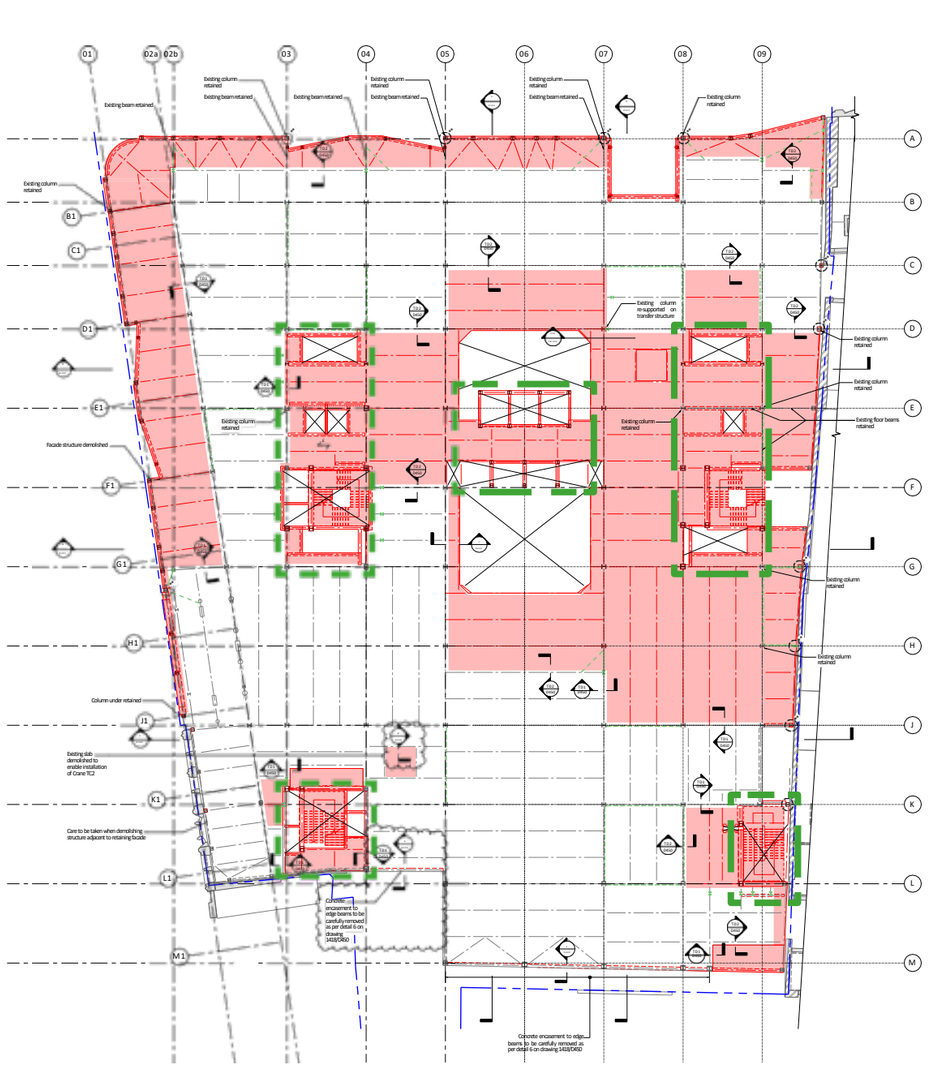
5 disconnected cores

Rationalised, light-filled facade

After

New central core

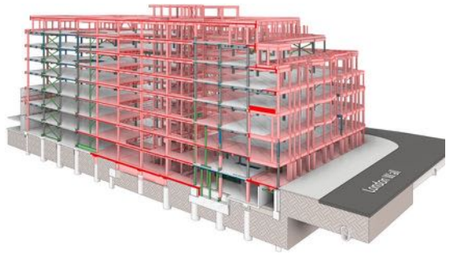
Design Response: Core Moves



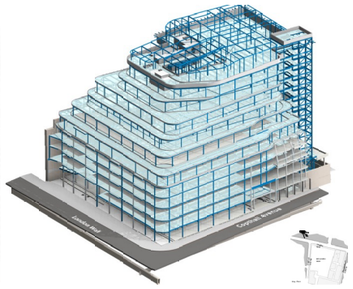
Brief - Practical Completion

London Wall Portland Stone Facade.

Architectural render



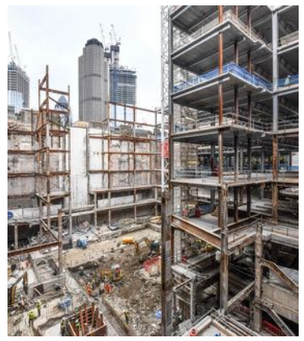
Demolition



2015 **Brief** **Existing** **Design** **Demo** **Fabrication** **Erection** **Completion** 2021

Existing Building (2015)

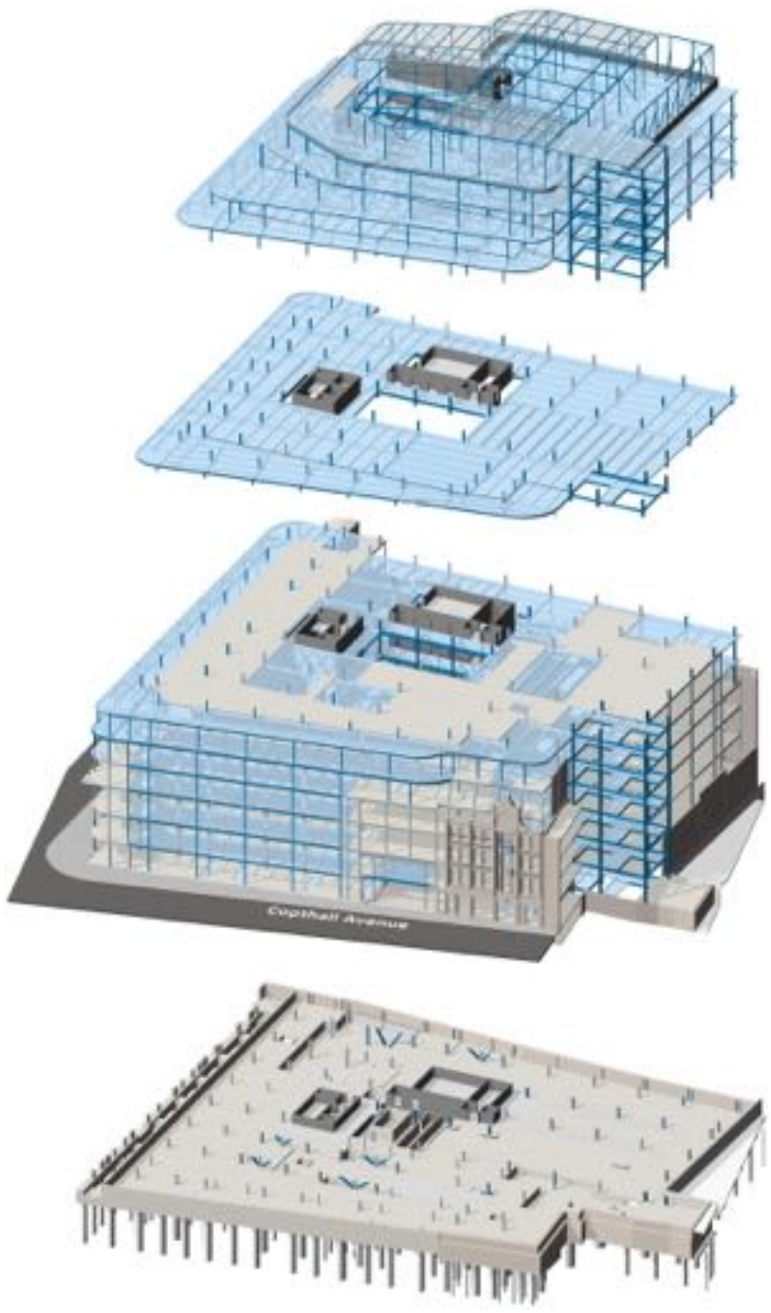
Steel frame demolition



Steel frame erection

Practical completion

Structural Design



+ Building area increased by 54%

+ 49% existing building retained

+ 10% existing columns strengthened to carry additional load

+ Piled foundations justified for 33% load increase

+ BIM level 2 standards

+ Four additional storeys plus plant deck level

+ Exposed steel structure throughout

Site History Timeline

Image of typical 16th century timber house along London Wall

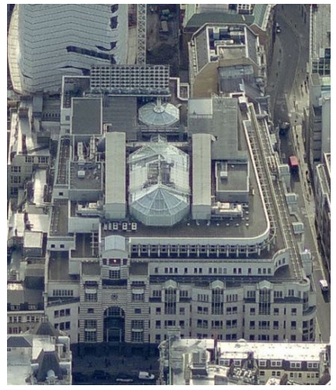
View of Little Bell Alley

Aerial View of Finsbury Circus

1958 - 1970 View of Copthall Avenue

Archaeological investigations and piling works on site

Site under construction



Aerial View

1550

1677

1794 - 1799

1887

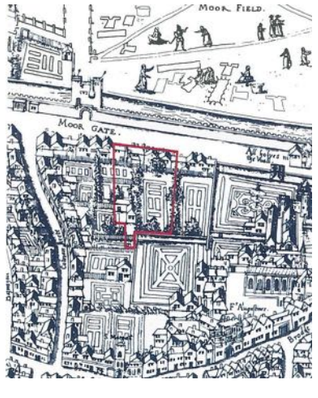
1947

1990

1992 - 1994

2015

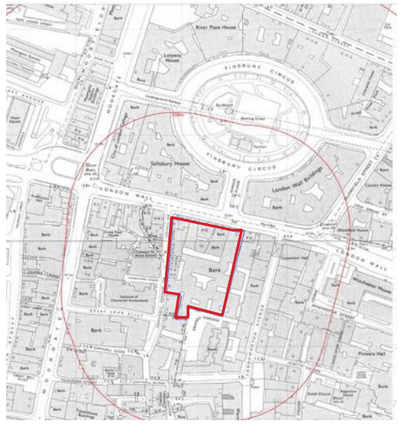
Copperplate Map of London Wall



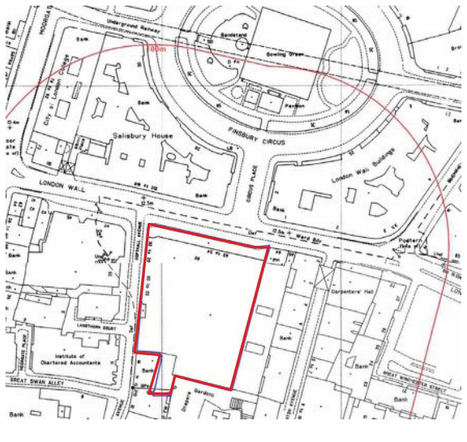
1677

1877 Fire Insurance Map

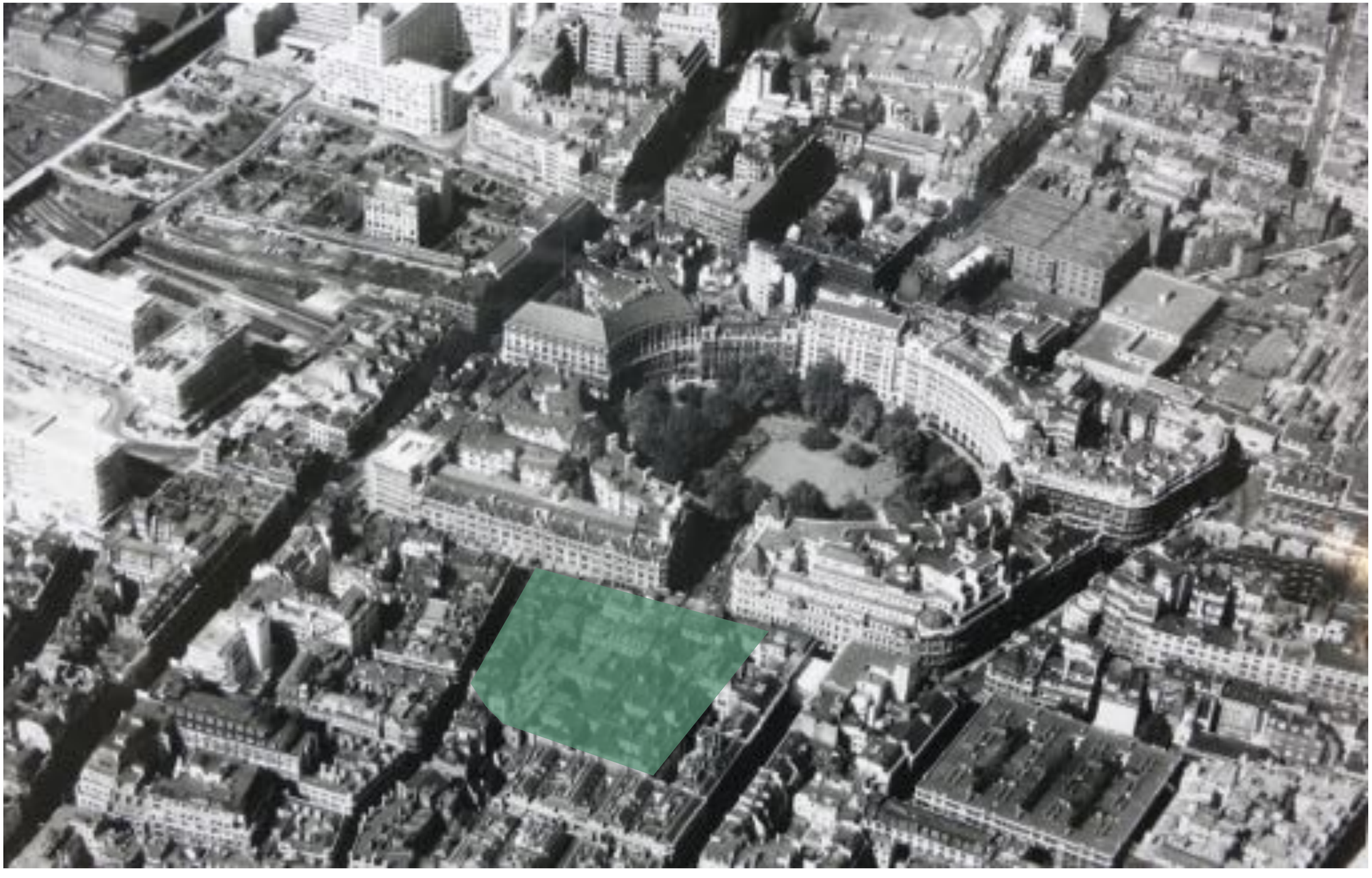
1971 - 1976



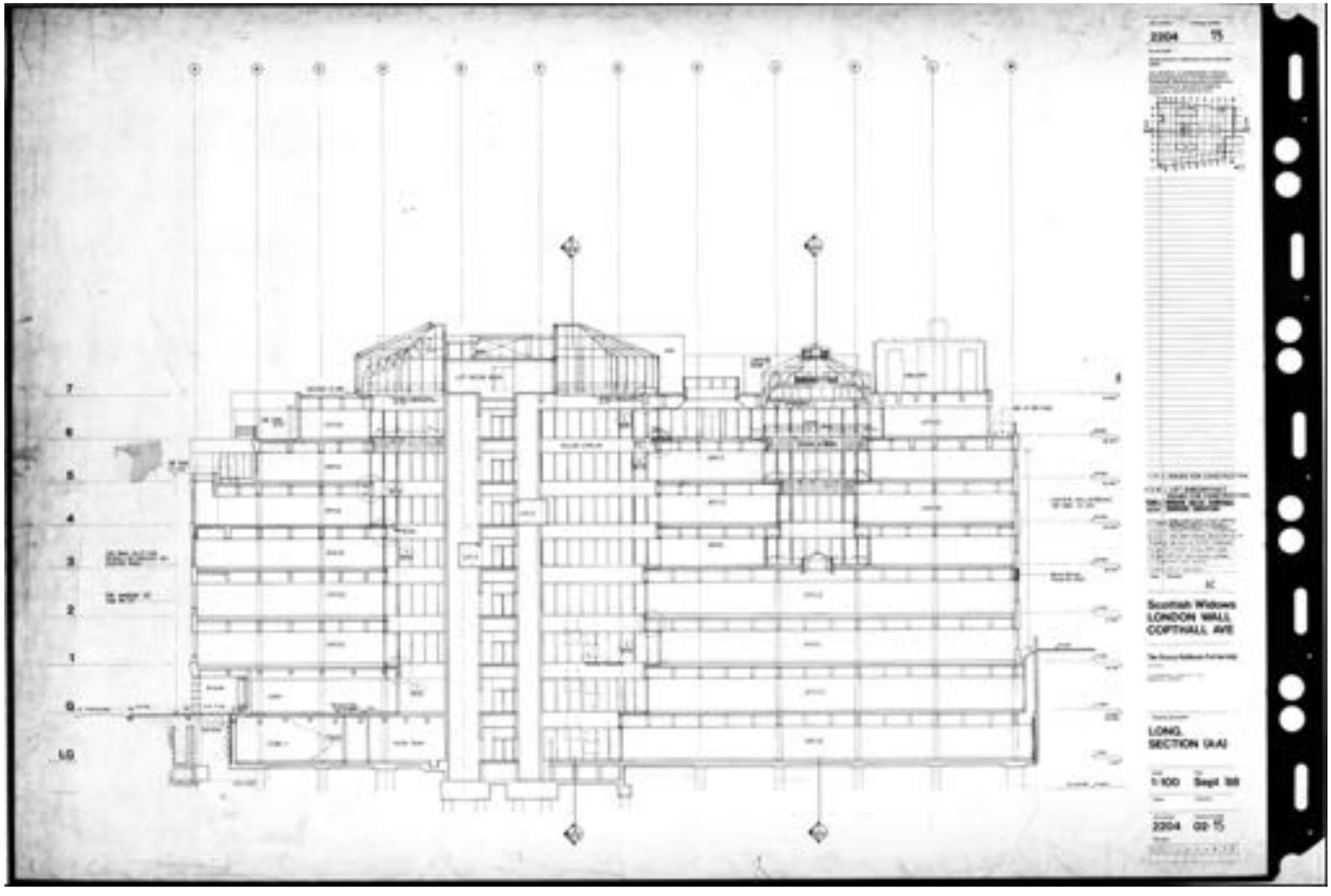
1992 - 1994



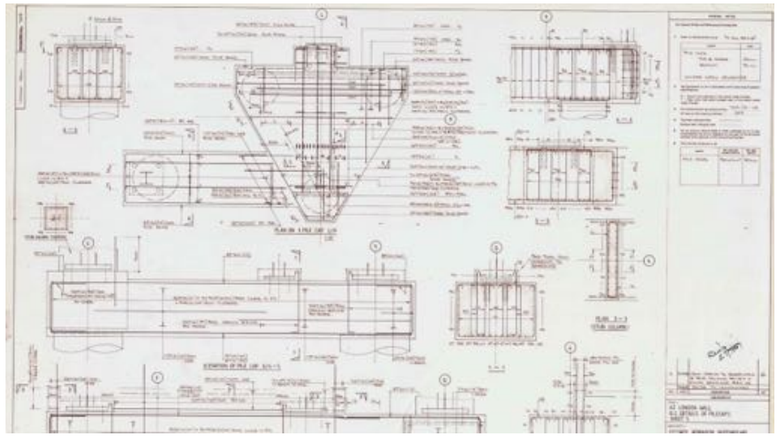
Existing Site

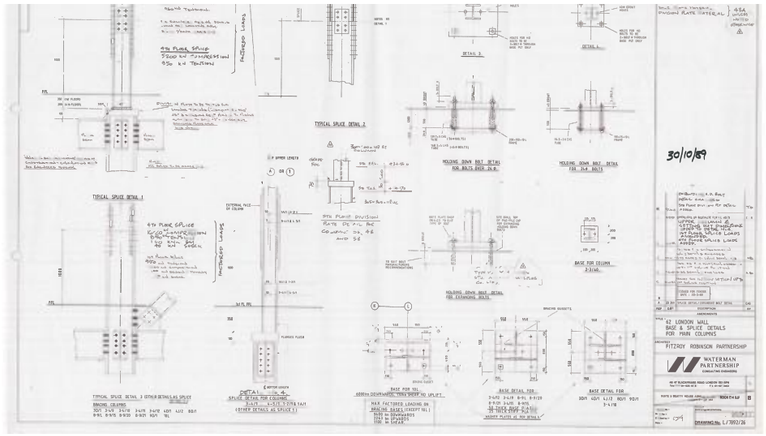


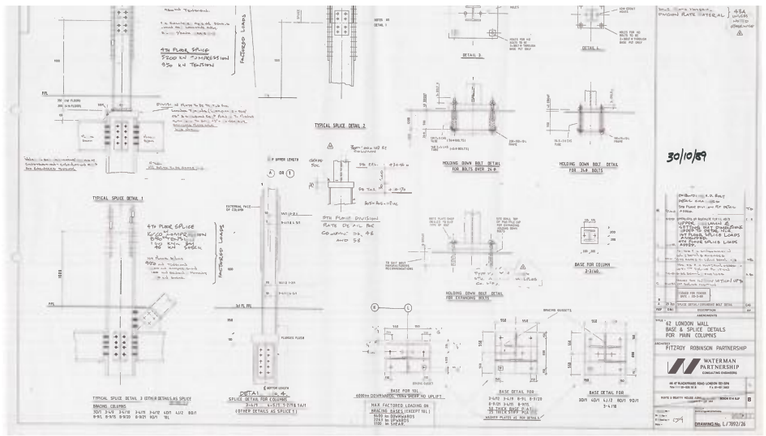
Existing Building - Archive Research

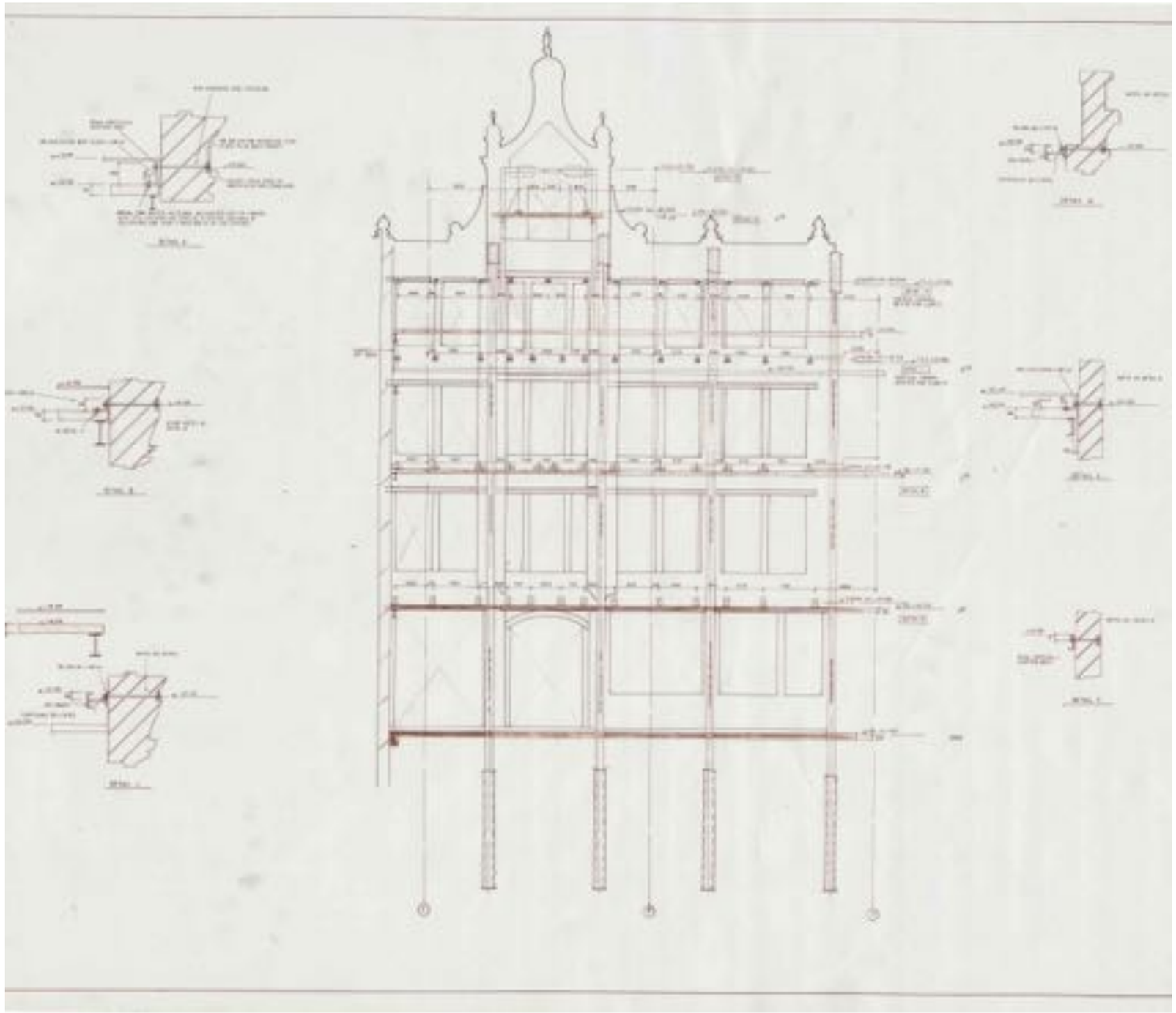


Existing Building - Archive Research

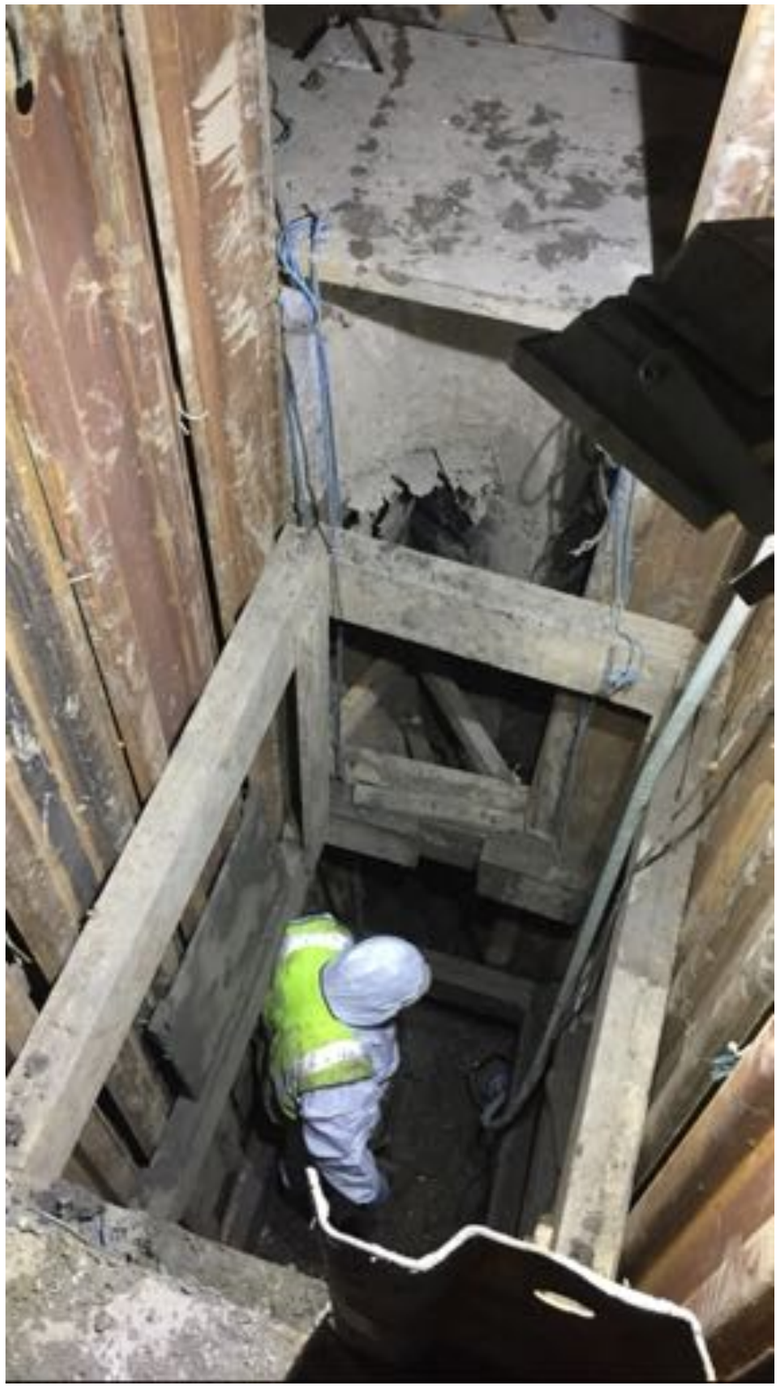


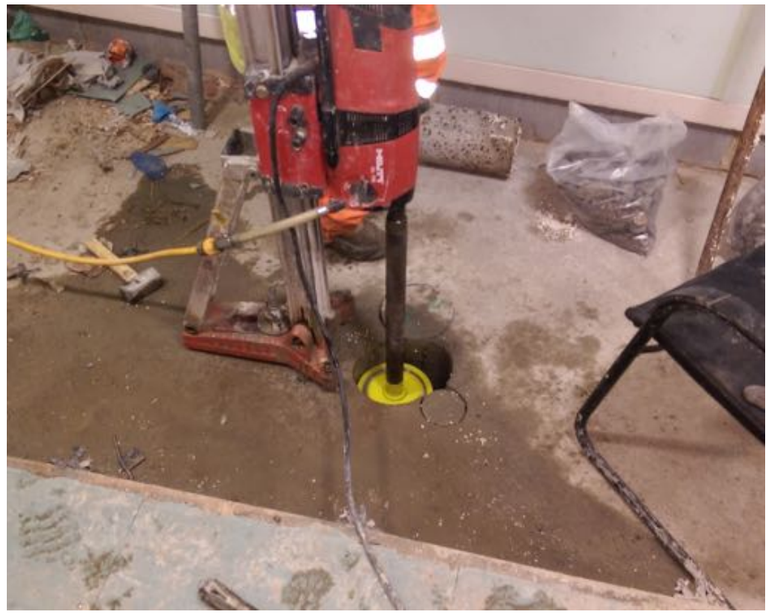






Existing Building - Investigations

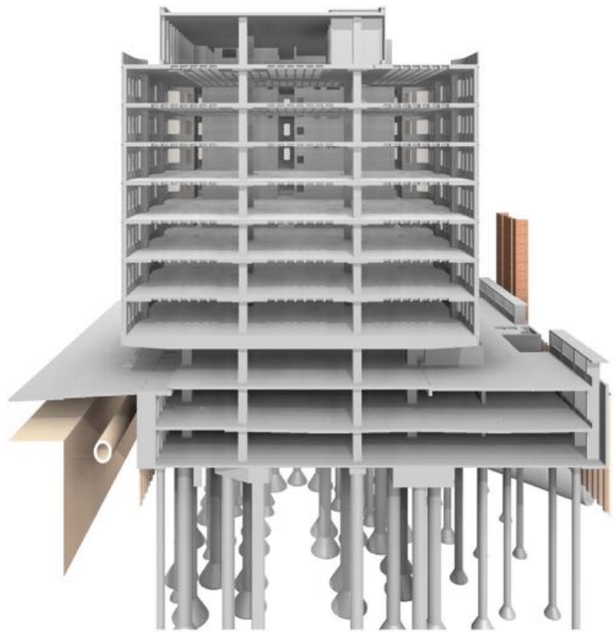


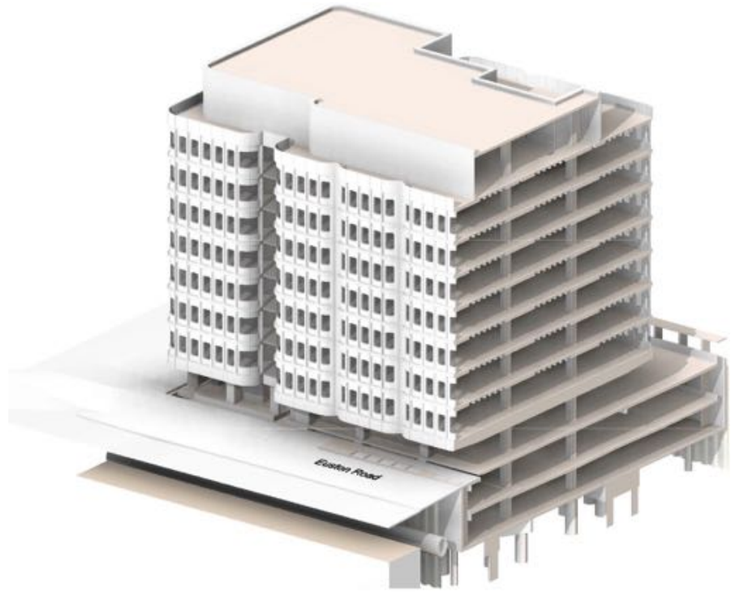


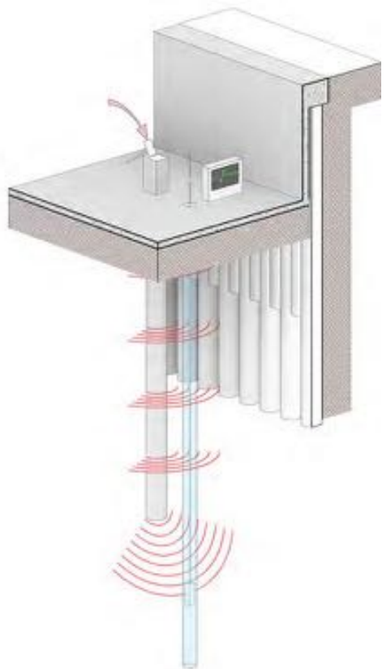
Pile Investigations & Testing

The re-use of piles relies on the recovery of archive information and an understanding of the existing building load paths. In the case of 60 London Wall, we have found archive drawings indicating pile layouts, and in some cases, design loads which we believe offers the opportunity to reduce the carbon impact of the project and re-use the existing piled foundations.

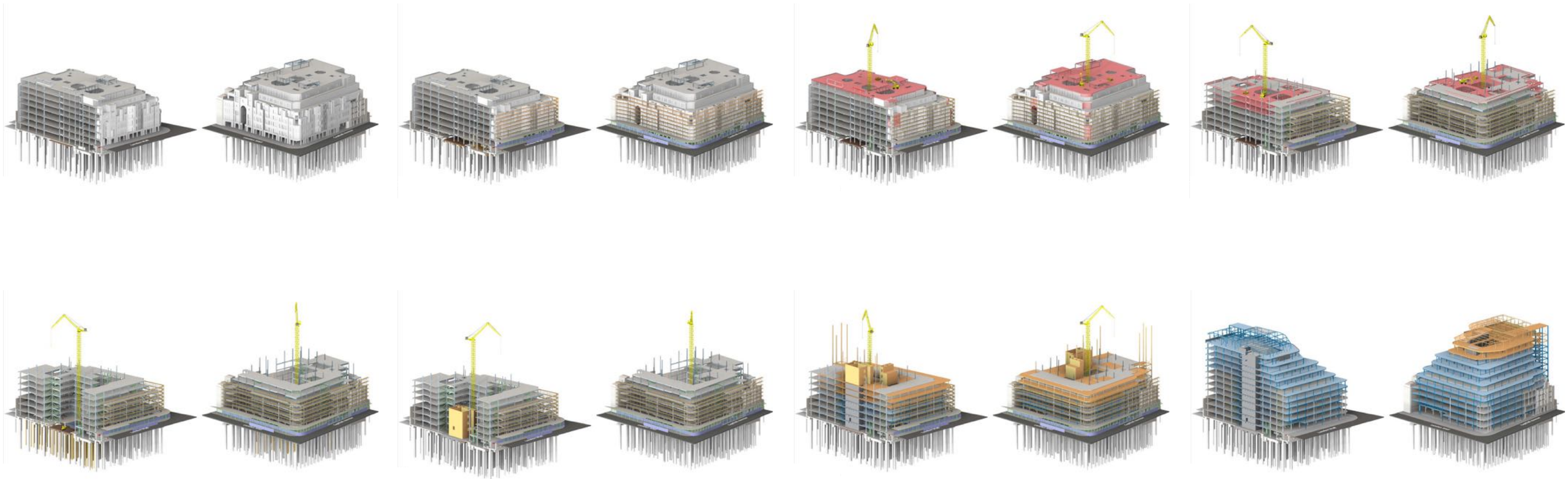
Where existing piles experience an increased load, as a result of the proposed structure, parallel seismic testing is required to verify the piles capacity. This process determines the unknown depth of the pile base, along with the approximate depth of the reinforcement contain within the pile. The process involves impacting the pile at slab level whilst lowering an ultrasonic sensor into a borehole completed adjacent to the existing pile. The returned sound profile can determine the required pile depths to allow the pile analysis to be completed.

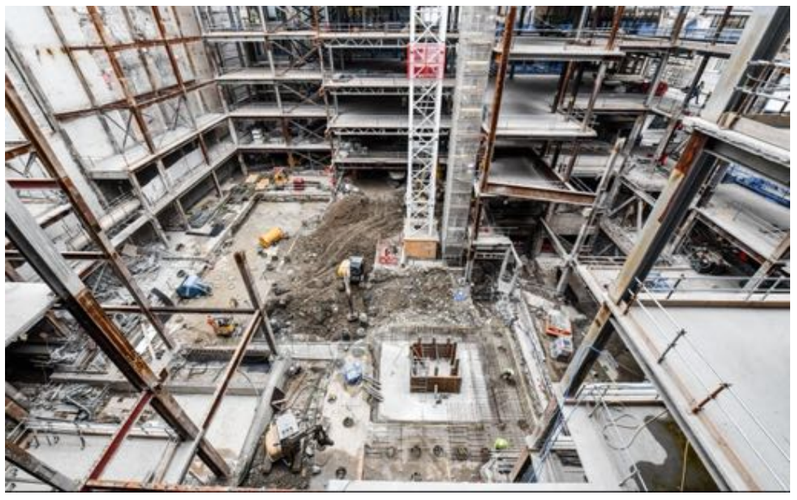






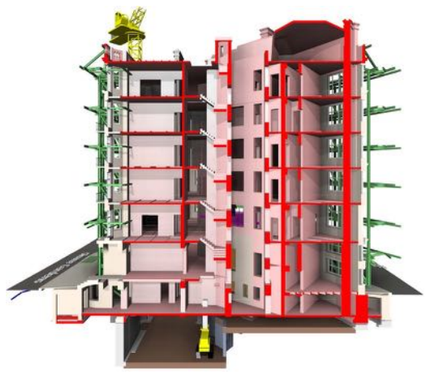
Optimising Programme On-Site - Total Engineering

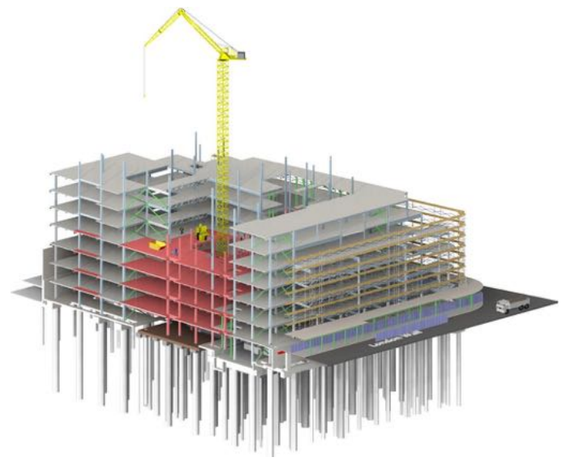




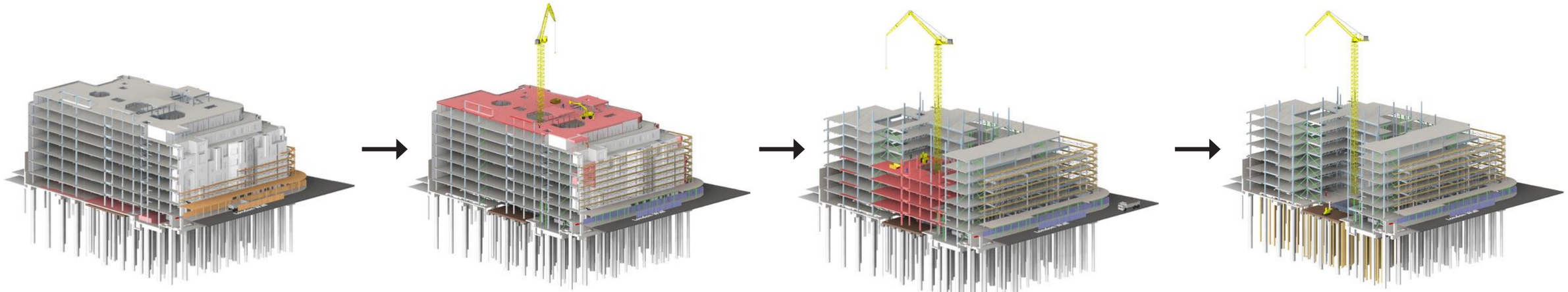
Total Engineering

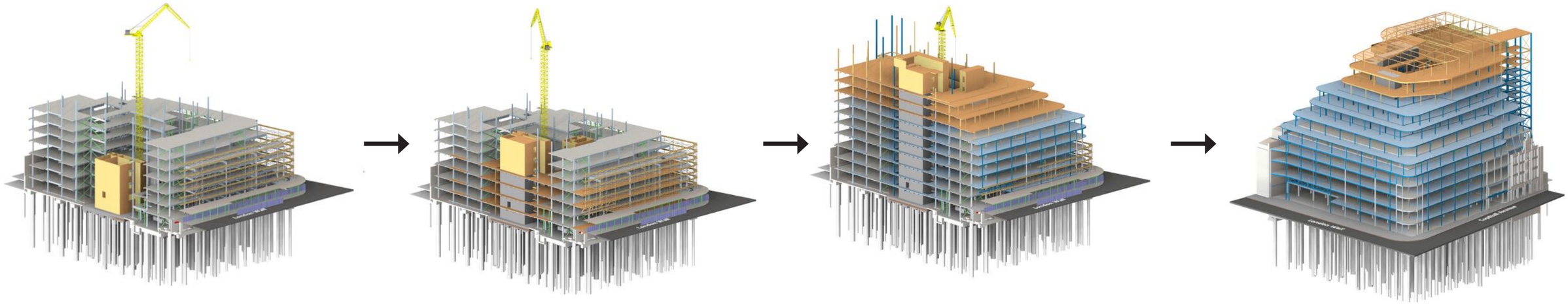
One holistic approach which measures everything, across all phases from strip out to practical completion.



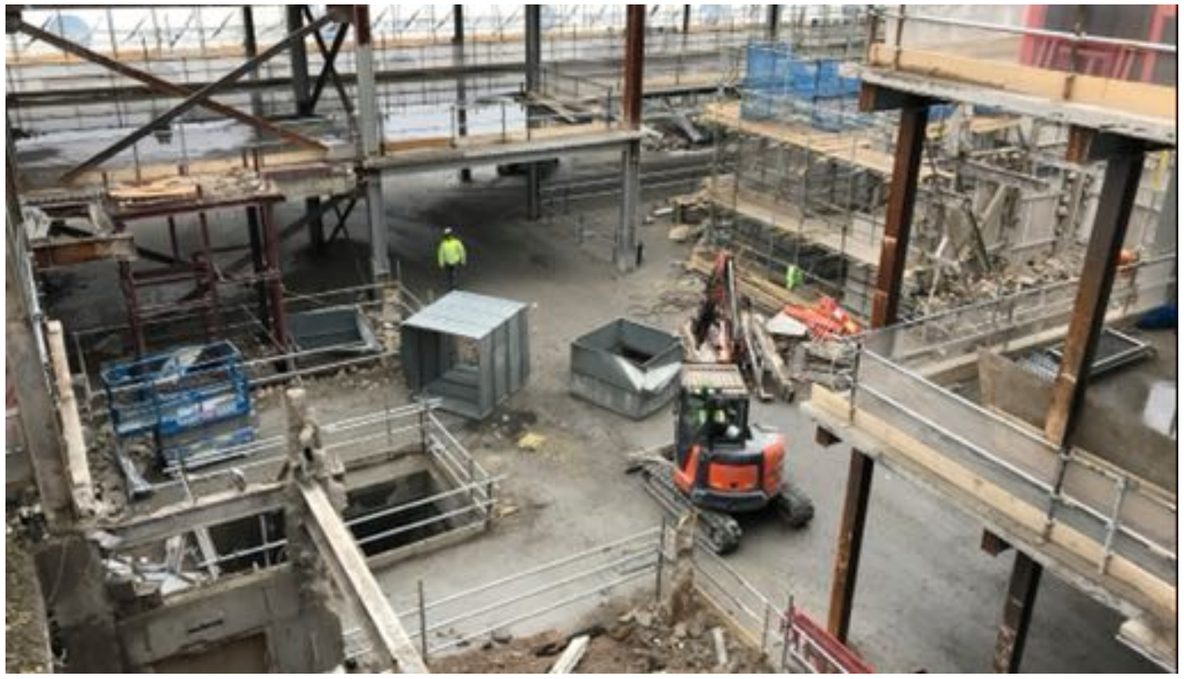


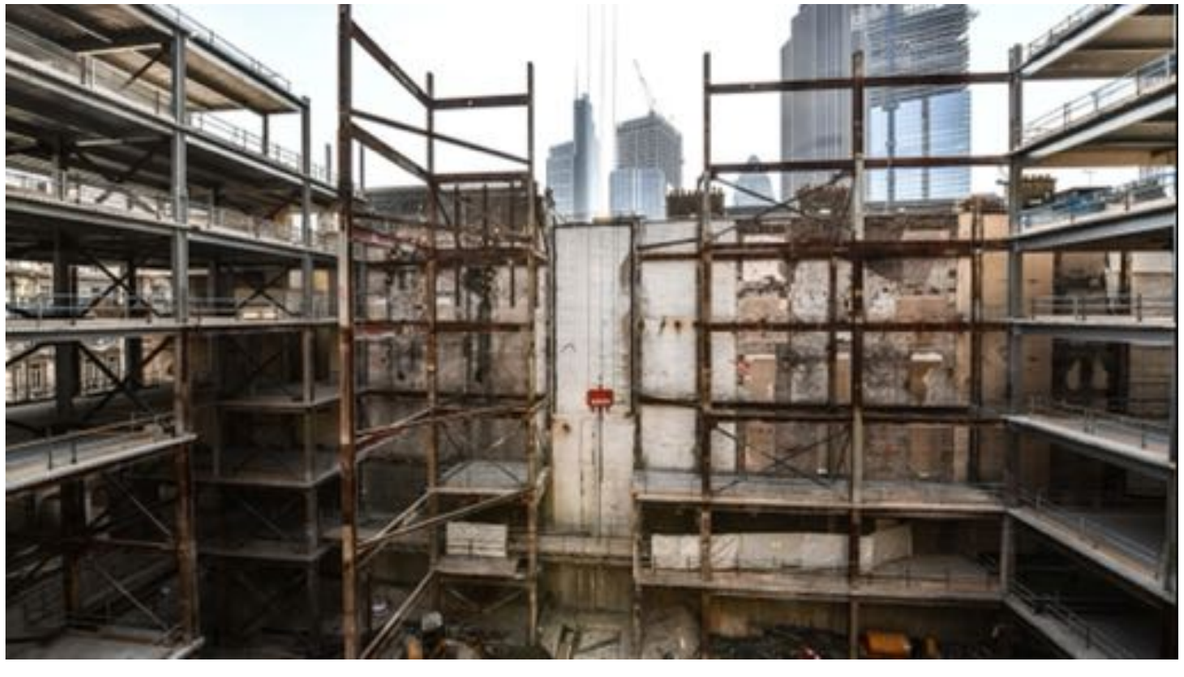
Construction Sequence





Demolition / Reuse

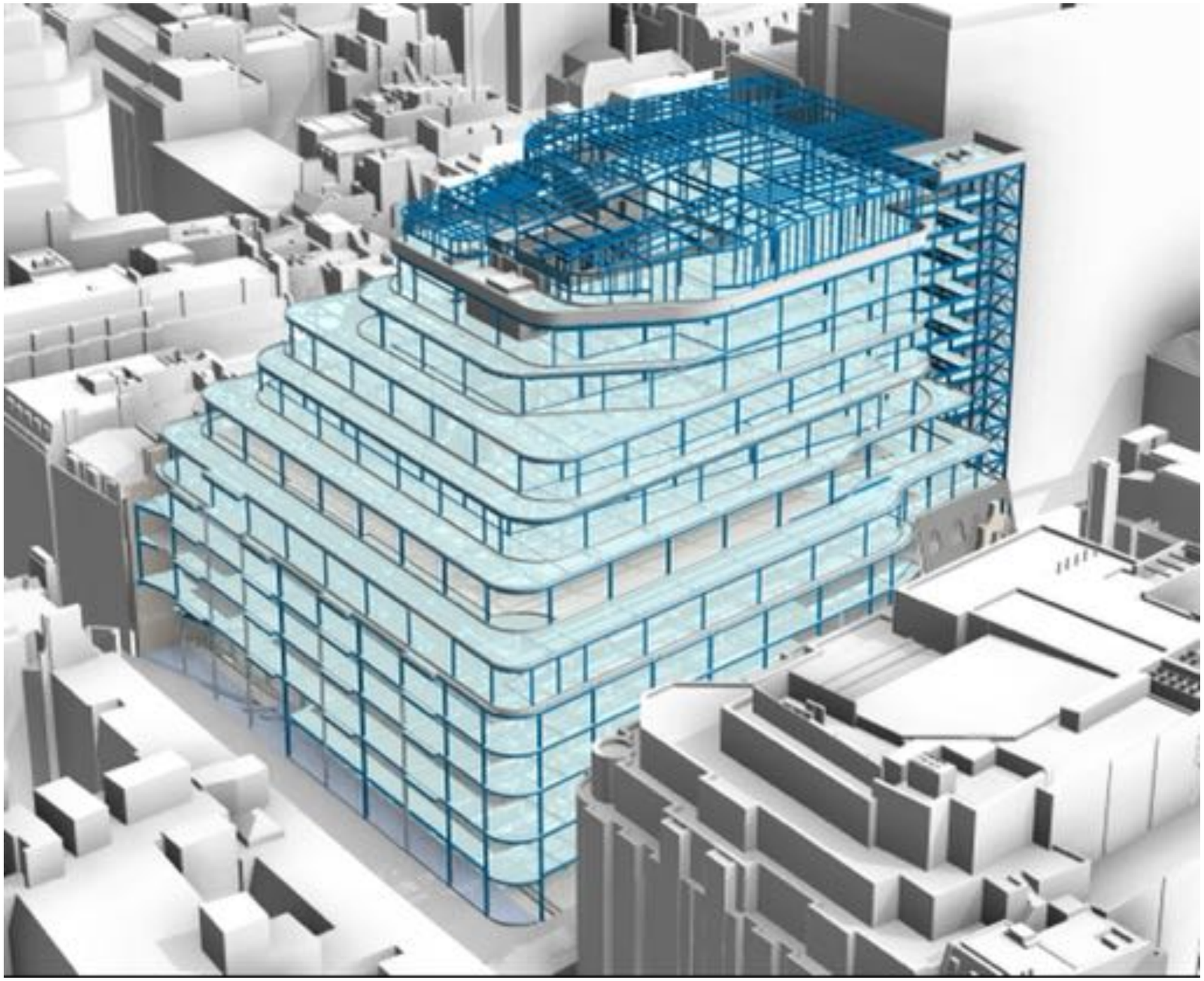


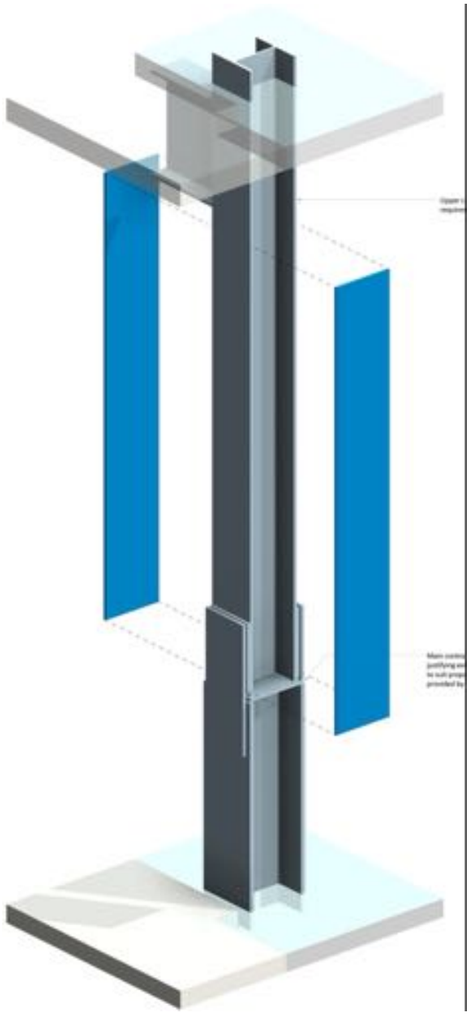


Demolition / Reuse

HEYNE TILLETT STEEL

Structural Steel Design

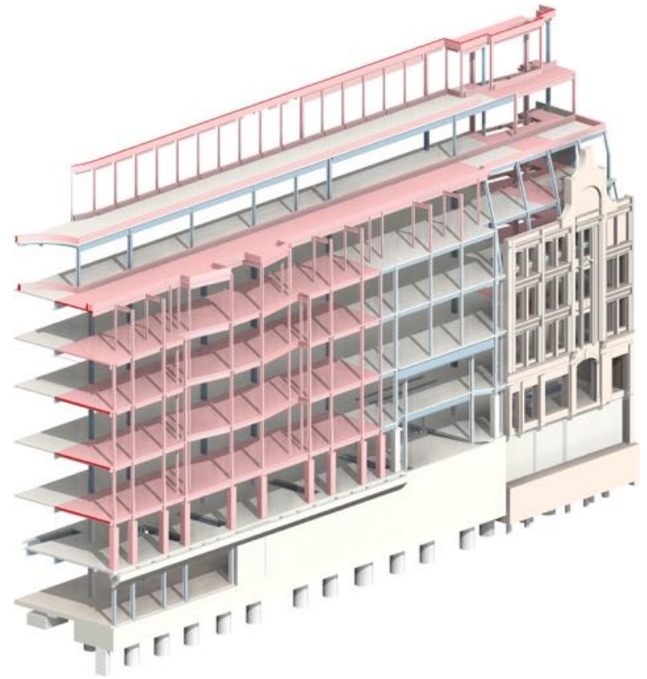




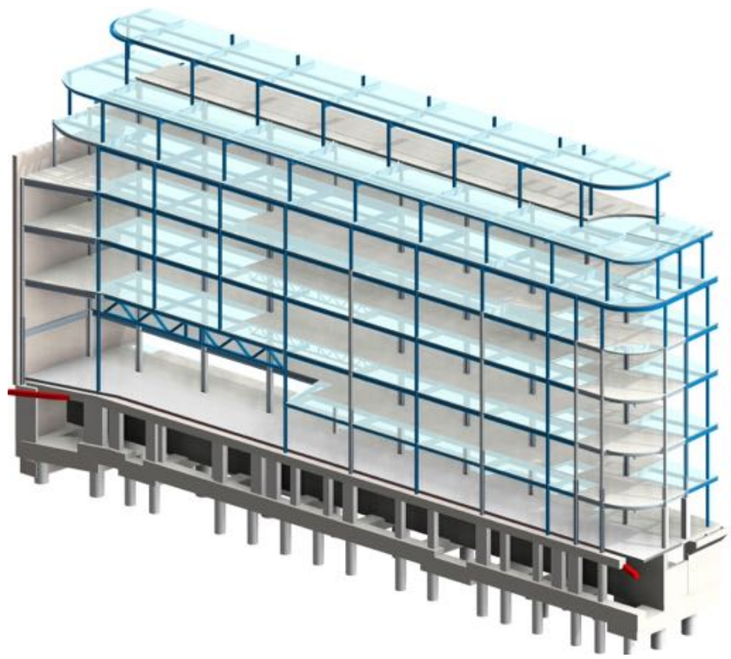
10% of existing columns strenghtened

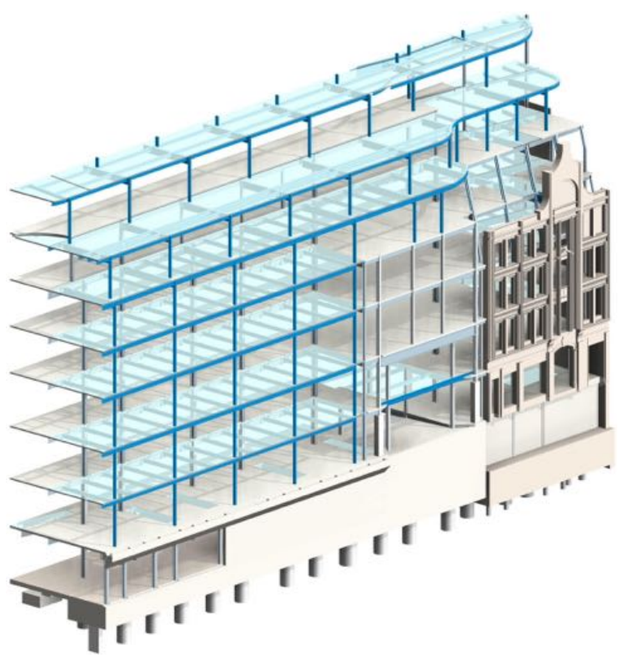
Facade Design

Existing

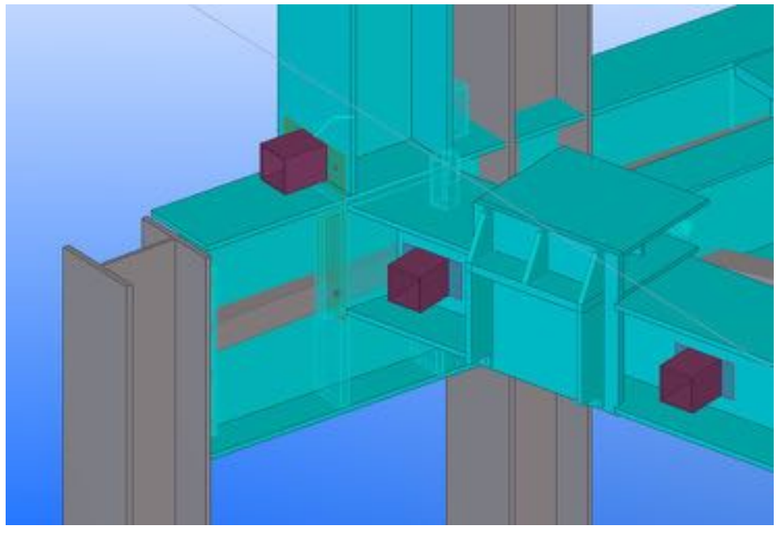


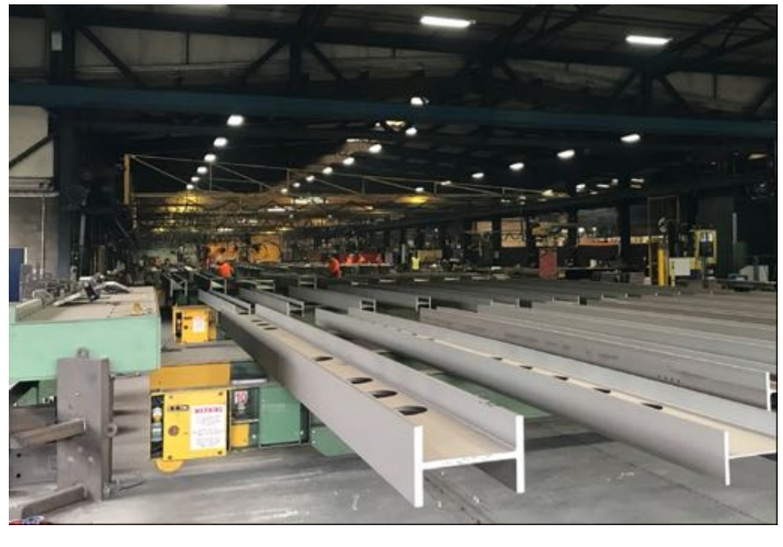
Proposed





Structural Steel Fabrication





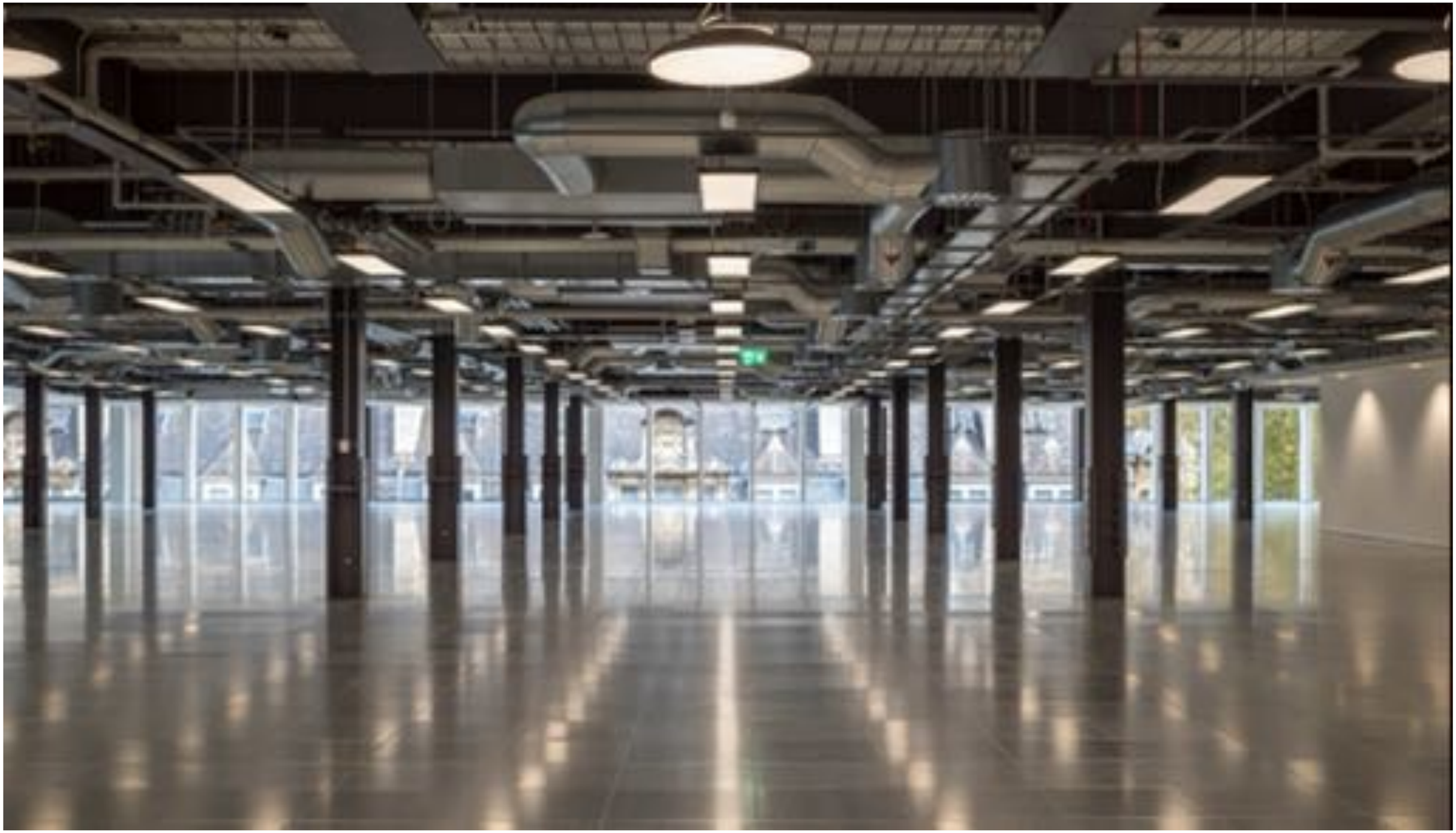
Structural Steel Erection

Structural Steel Erection

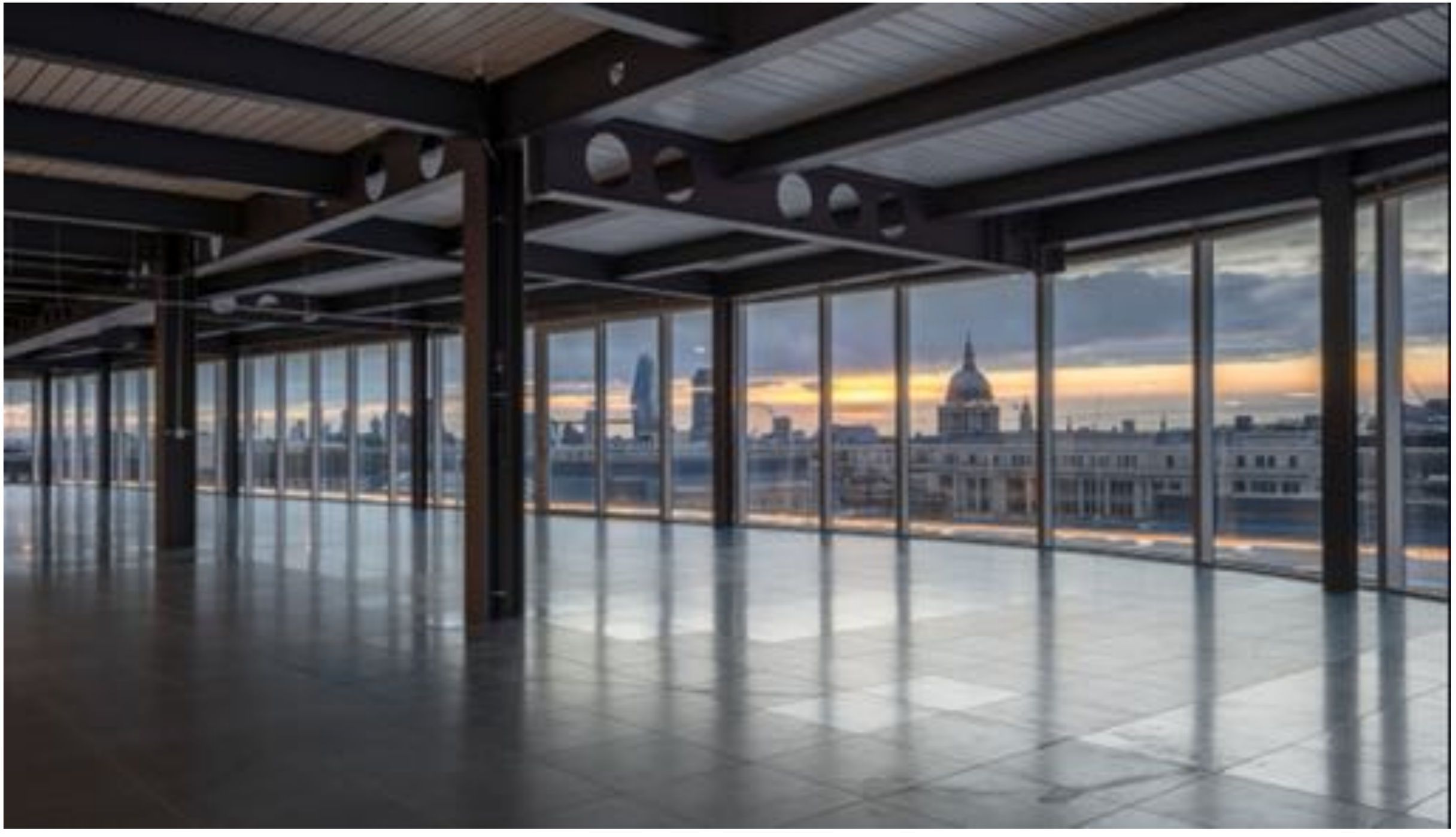
Structural Steel Erection

Completion

Completion



Completion



Completion

Completion

Completion

Completion

Retained Structure

Retained existing GIA:

30,024 m ^{2}

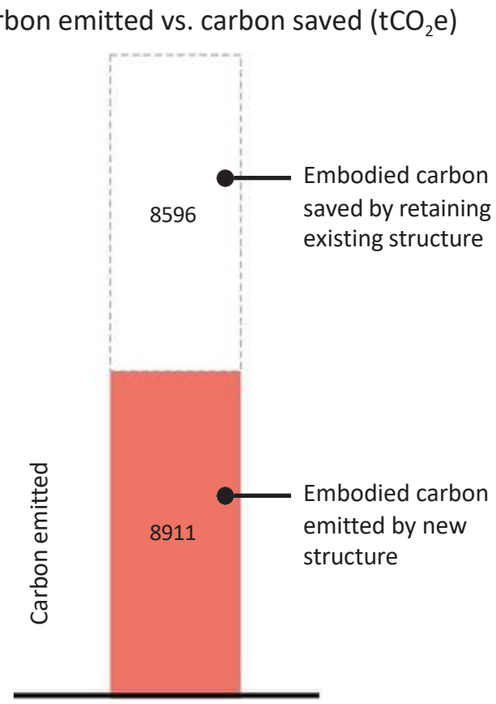
Percentage of retained structure by volume:

49%

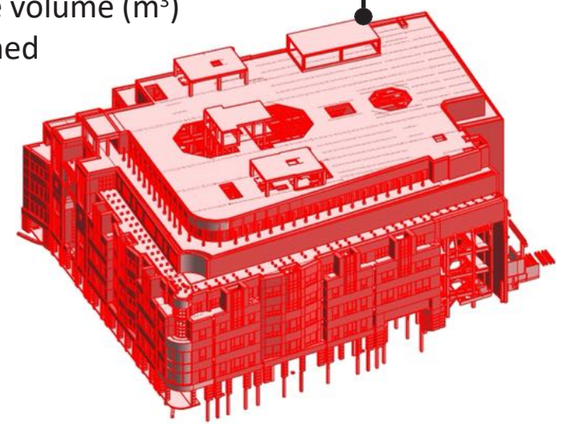
Embodied carbon retained*:

8,596 tCO_2e

*Assuming modern embodied carbon rates

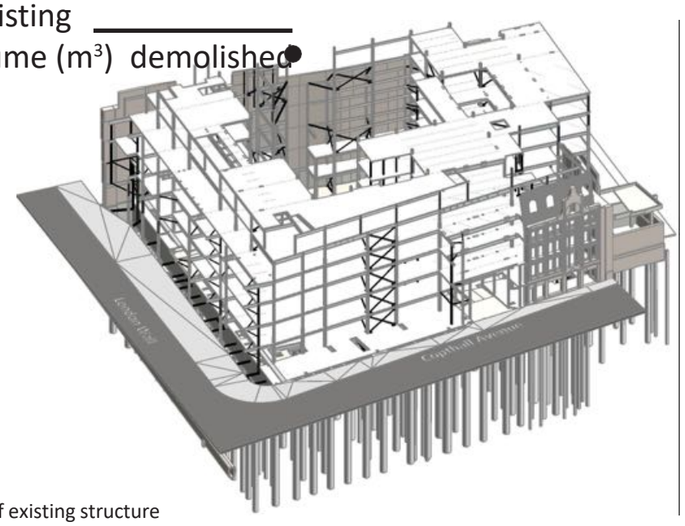


51% of the existing structure volume (m^3) demolished



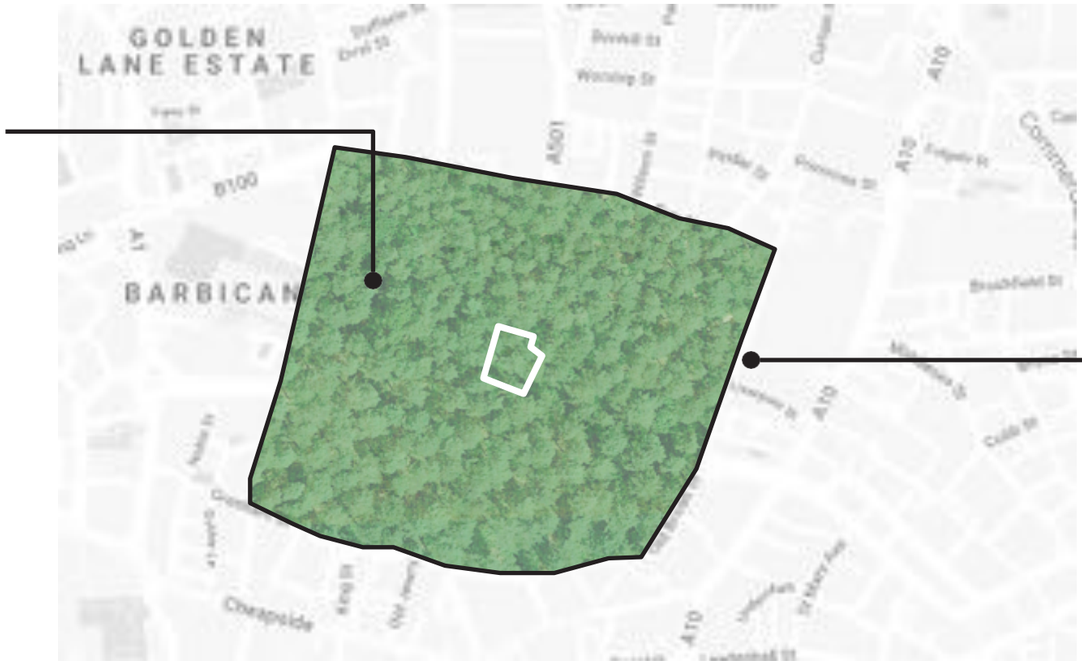
3D Image of demolished building

49% of the existing structure volume (m^3) demolished



3D Image of existing structure

422,691m^2 of native forest representing embodied carbon saved by retaining 49% of existing structure



Retaining most of the existing structure avoids this carbon emission, keeping the 10171 tonnes of CO_2e locked into the existing building.

Proposed Structure

Proposed total embodied carbon:

8,911 tCO$_2$e

Proposed total embodied carbon per m^2 total GIA:

193 kg CO$_2$e/m^2

Proposed total embodied carbon per m^2 new GIA:

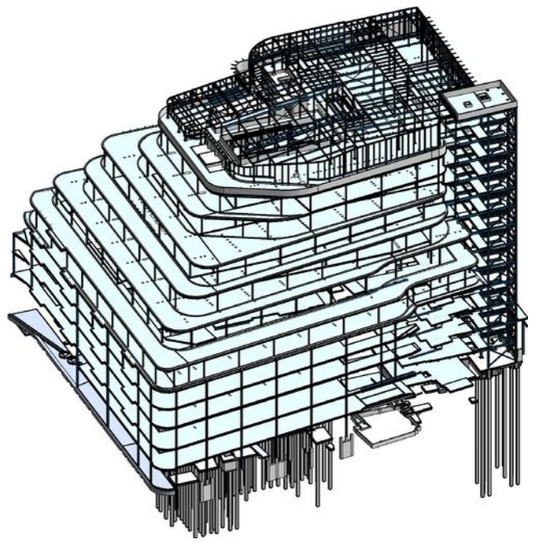
550 kg CO$_2$e/m^2

RIBA 2030 target [2]:

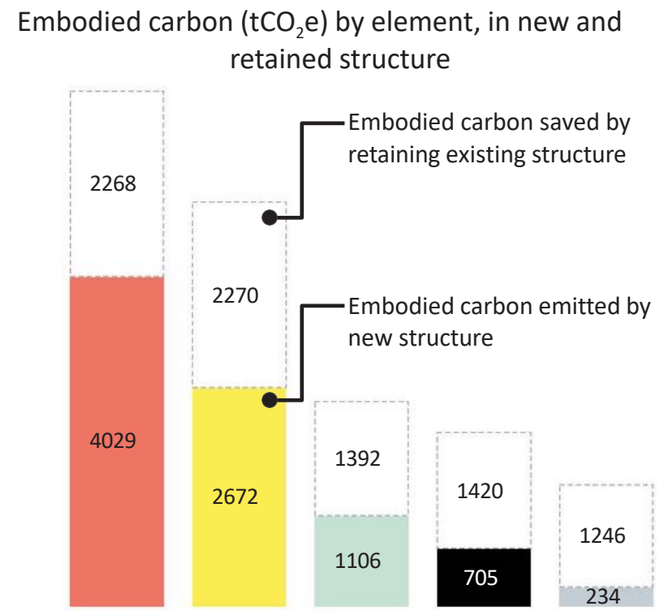
169 kg CO$_2$e/m^2

LETI 2030 target [3]:

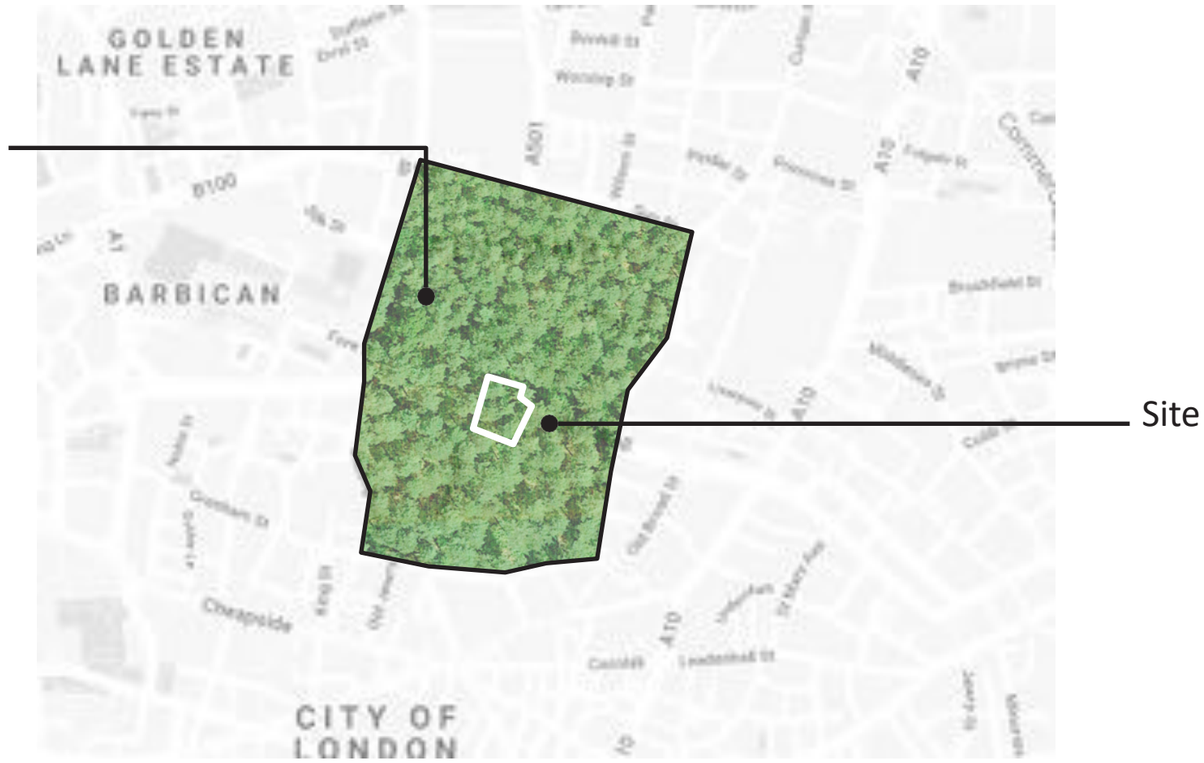
228 kg CO$_2$e/m^2



3D Image of proposed structure



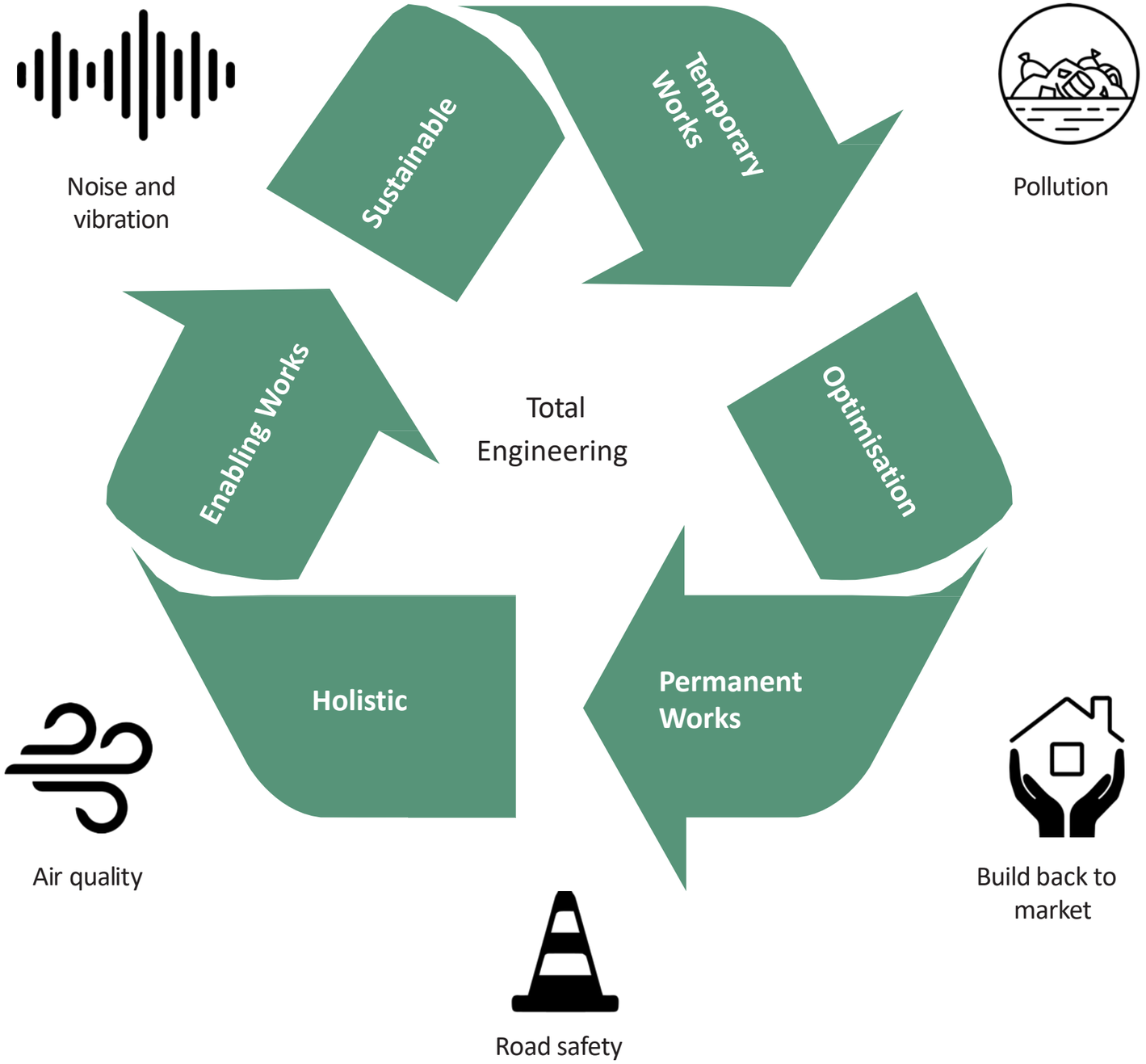
184,727m^2 of native forest required to sequester embodied carbon of proposed structure



(2)Embodied carbon covers Stages A1-A5 (cradle to practical completion) plus demolition of existing structure.

(3) Targets represent year of anticipated project completion.

Reusing the Structure



A Change of Order is Required

The Old Way: “Sketch a vision and make it work”

Sketch / Draw → Investigate → Test → Justify → Demolish or Strengthen

The New Way: “We research, interrogate and collaborate to identify opportunity and potential”

Research → Model → Test → Explore → Create

Be Lead by the Science, Engineering and Architecture

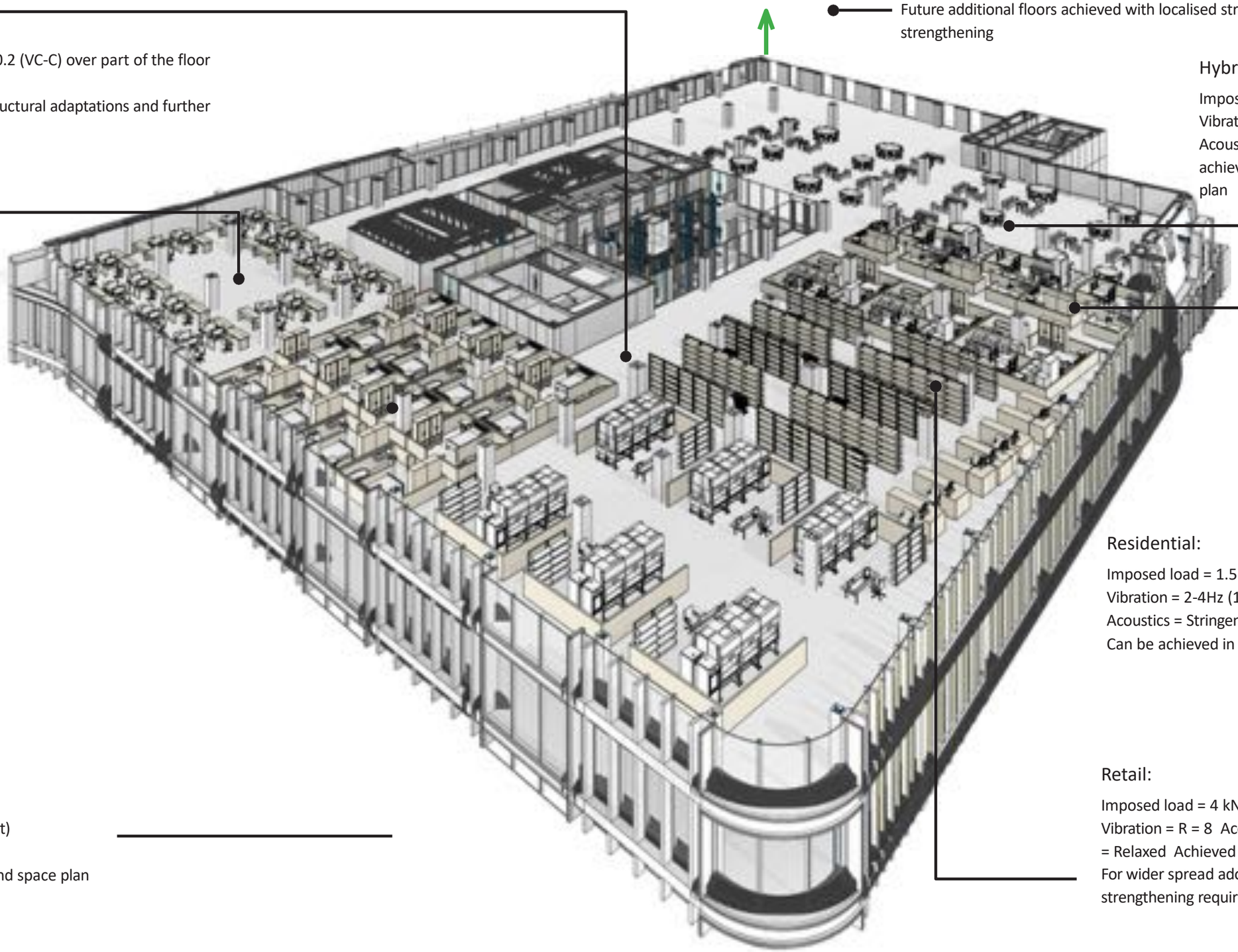
Sustainability - Design for Adaptability - Loose Fit for a Long Life

Life Science:

Imposed load = 4 +1 kN/m²
Vibration =R=0.5 (VC-A), R=0.2 (VC-C) over part of the floor
Acoustics = Medium
Achievable with localised structural adaptations and further strenghtening

Office:

Imposed load = 2.5 kN/m²
Vibration = 4 Hz, R = 8
Acoustics = Medium
Achieved



Future additional floors achieved with localised structural strengthening

Hybrid Space:

Imposed load = 2.5 kN/m²
Vibration = 4Hz, R = 8
Acoustics = Medium - Can be achieved in finishes and space plan

Residential:

Imposed load = 1.5 kN/m²
Vibration = 2-4Hz (1.4 at night)
Acoustics = Stringent
Can be achieved in finishes and space plan

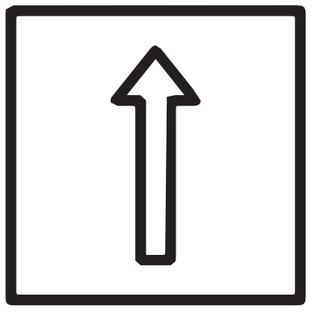
Hotel:

Imposed load = 2 kN/m²
Vibration = 2-4Hz (1.4 at night)
Acoustics = Stringent
Can be achieved in finishes and space plan

Retail:

Imposed load = 4 kN/m²
Vibration = R = 8 Acoustics = Relaxed Achieved locally
For wider spread adoption localised strengthening required

Key Takeaways



Existing

30,024 m^2

Proposed

46,238 m^2

Area gained

16,214 m^2

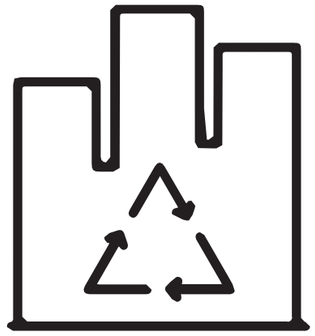
Embodied carbon:

Total Structural Carbon:

193 co_2e/m^2

LETI 2030: 228

RIBA 2030: 169

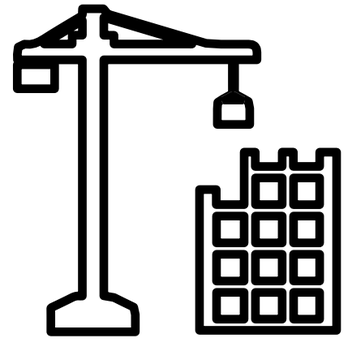


Future adaptability 100

+ year design life

Adaptable chassis

Long Life Loose Fit



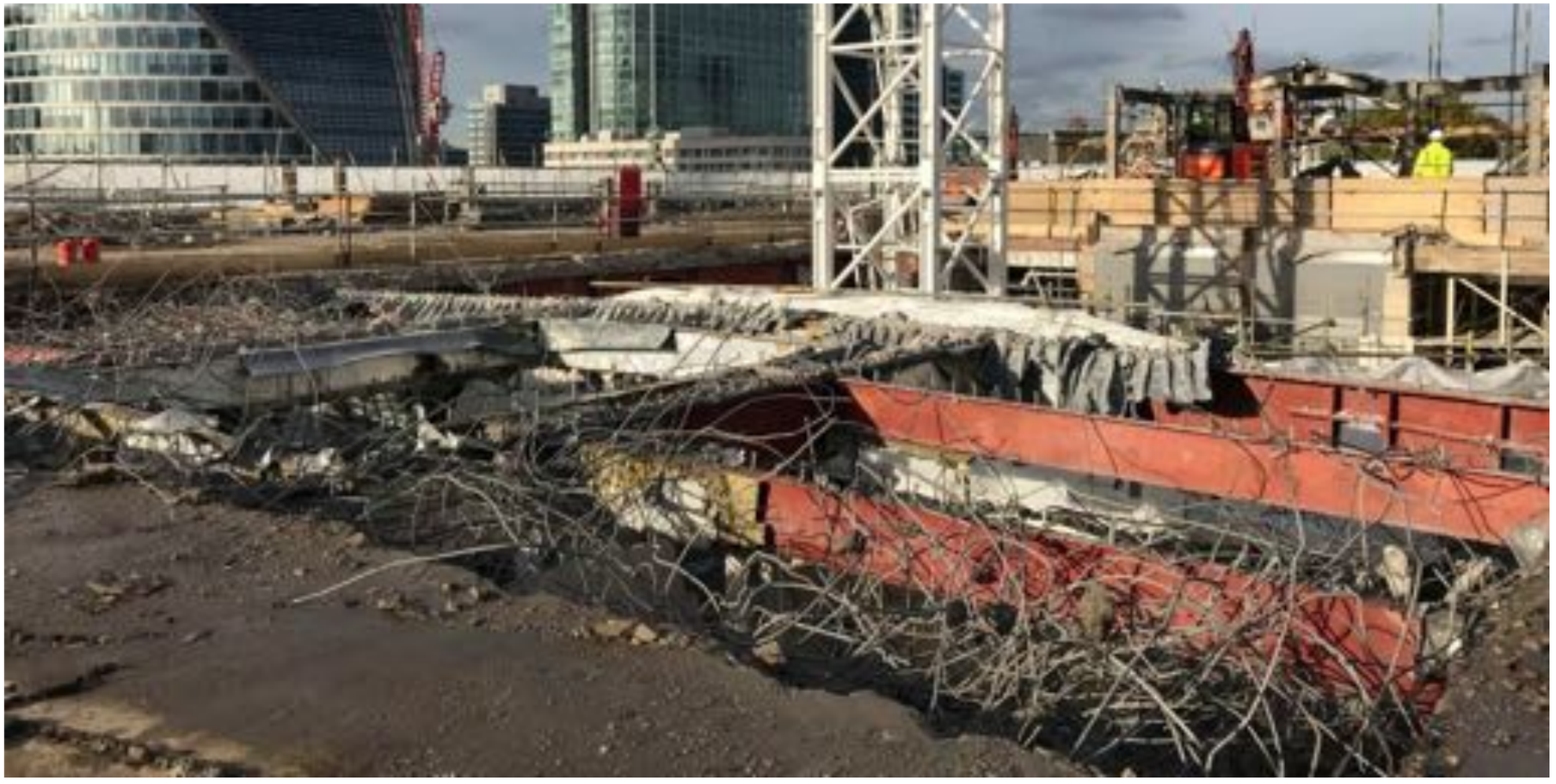
Steel tonnage

2131 Tns

65 kg/m^2 (new area) 46 kg/m^2 (total area)

A unique response - the warranty of new structure with the sustainability of a retained frame

If We Were Doing It Today, How Could We Go Further?



Salvage not Scrap

Sites always used to be deconstructed

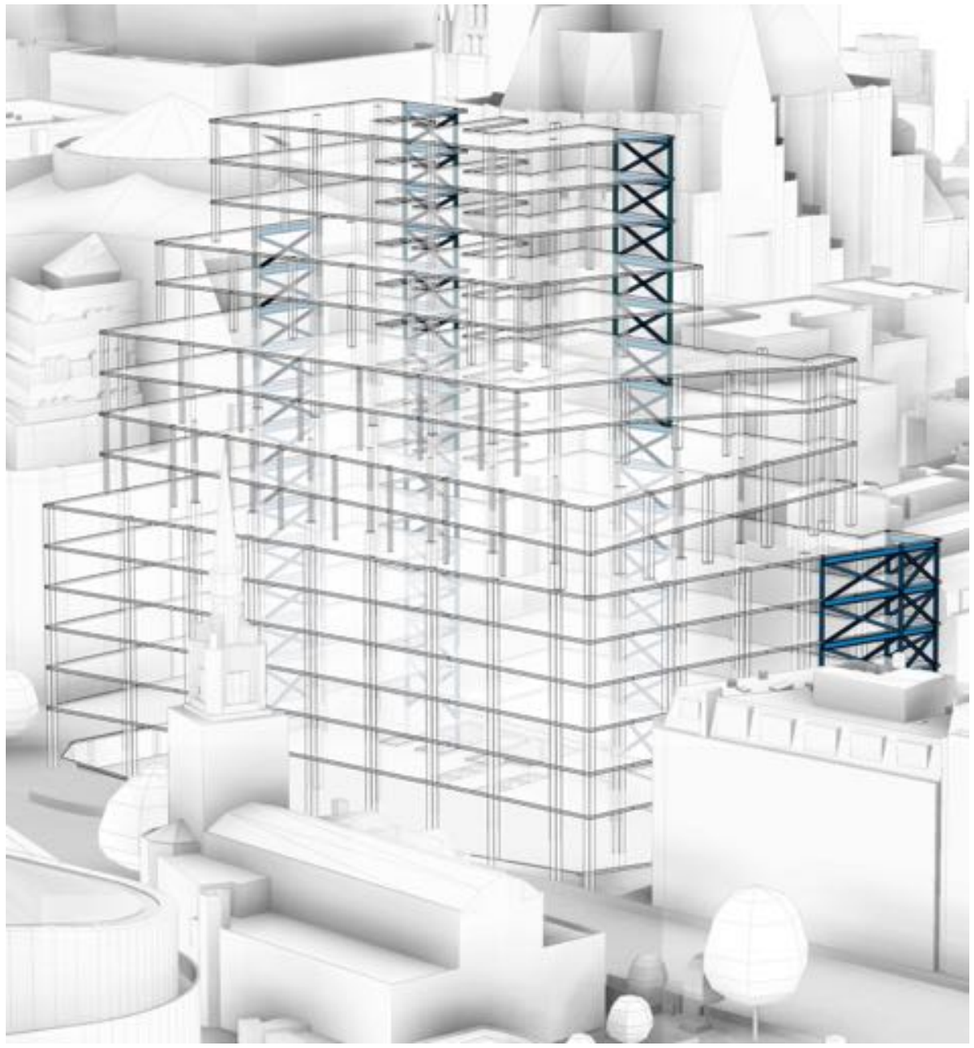
Salvage not scrap

£110 / Tonne - £250 / Tonne

Need Clients, Demolition Contractors. Engineers and Fabricators to come together

Soft Core - True Sustainability, Long Life, Loose Fit

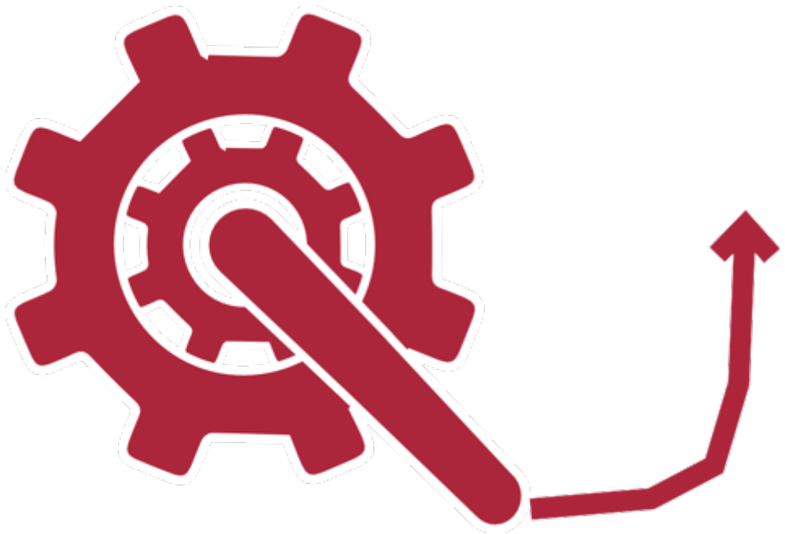
Traditional RC Stability Core



Soft Core Approach

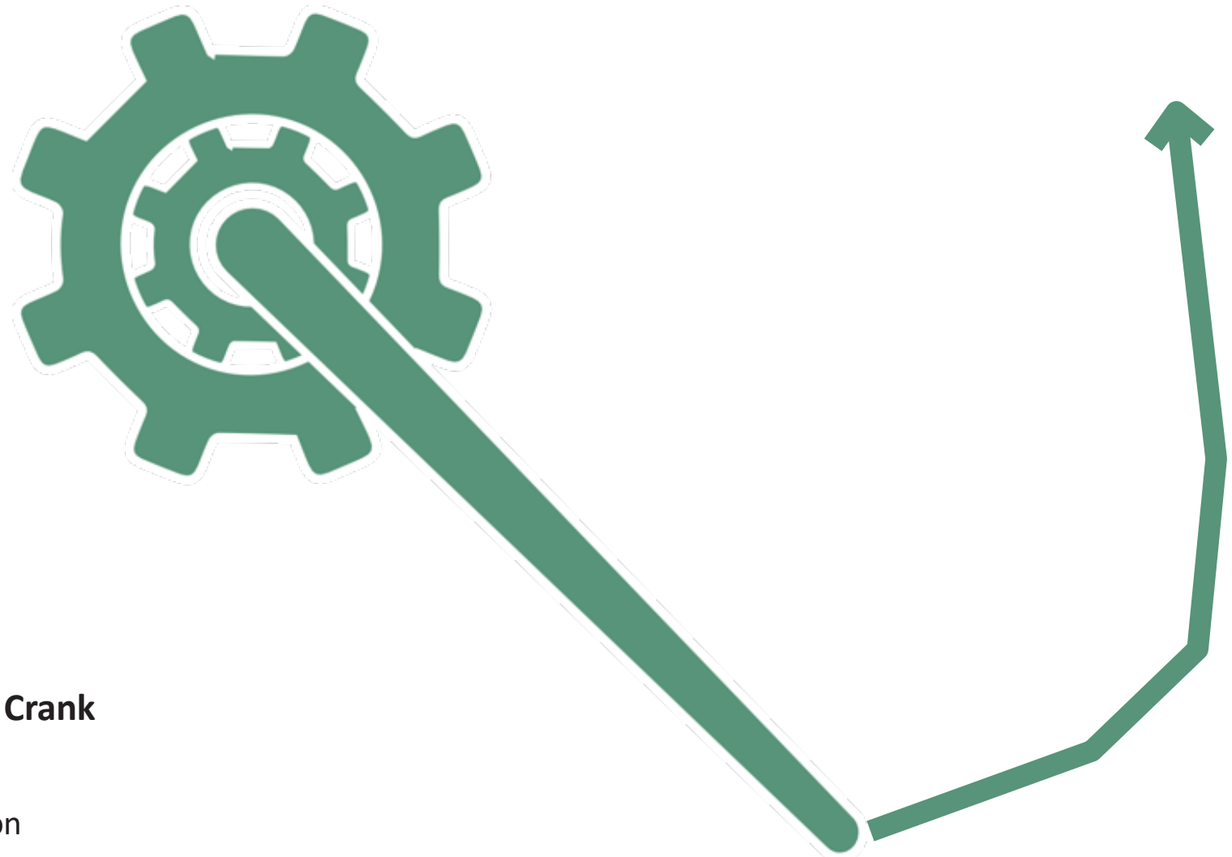
Maximise future flexibility

Core Adaptability - The Principle



Short Pedal Crank

+ Hard Work

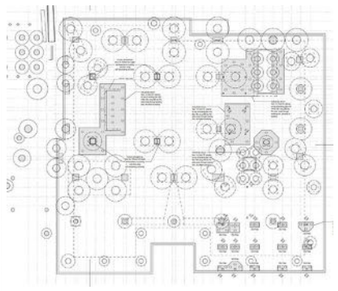


Long Pedal Crank

+ Easy Work
+ Less Carbon

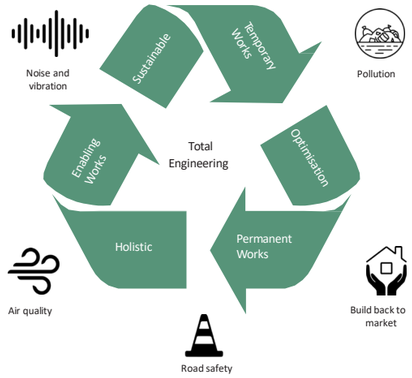
Reset the Design Collaboration Process...

Research



Testing

Finding the Opportunities

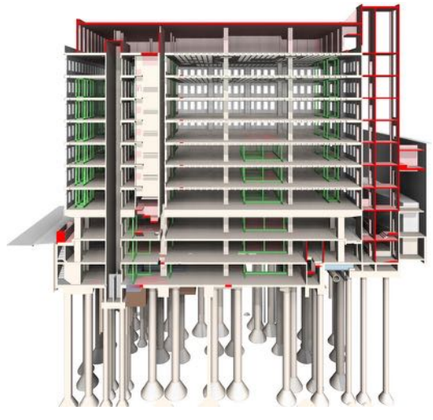


Total Engineering + Contractor Input

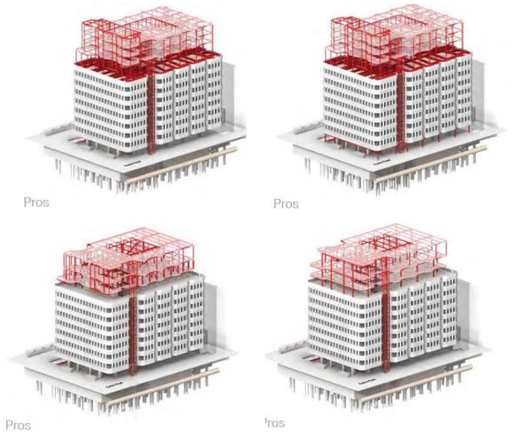
Process: continuing throughout in real time

Investigations

Modelling the Bones and Structure



Option Testing Cost, Programme, Carbon



Client and design team make an informed decision

...Understand the Asset Before you Define the Proposal

We Must Change the Parameters - Buildings are Forever

Live Long and Prosper - 180 Year Design Life

+ Currently, commercial buildings are designed for a 60 year life span – although a large proportion of UK building stock is Victorian
+ A new building designed for a 180-year life span will last until 2201
+ Life time achievement awards. Be all it can be, design for the unknown

1970 1980 1990 2000 2010 2020 2030 2040 → 2150

2016 Paris Climate Agreement

For true and honest sustainability we need a lifetime carbon tax now