FRANKHAM

15-17 Eldon Street

Frankham assisted with the structural engineering aspects of a comprehensive refurbishment of all the offices and retail areas of this building.

The aspirations for the scheme included improving the appearance and quality of the entrance into the office space by re-arranging the layout and replacing the existing façade. Additional office space was also added by extending vertically. Alternative options for the retail space at lower ground level were explored and the entrance relocated to the side ally.

Our scope included a review of the existing reinforced concrete structure and foundations to assess the capacity for additional floors and identify strengthening works required to accommodate the additional floors. Options were reviewed for the additional floors before taking the design to tender stage for a design and build contractor to complete.

Client
City of London

Services
Structural Engineering

Sector
Commercial

Value
£21m

Duration
January 2020 - June 2022

Added Value

Due to the constraints of working with the existing structure, our opportunities to provide value to the client were achieved through close collaboration with the architect. Collectively, we identified ways to adapt the structure while minimising the strengthening works required to accommodate these changes.

New risers were required from basement through the building, so areas where penetrations could be accommodated with minimal strengthening works were identified. Similarly, a goods lift was required between ground and lower ground which we were able to locate within an area close to the stairs therefore minimising the strengthening works required.

Options for alterations to the vertical circulation routes were explored. In the existing arrangement, the stairs were within cores consisting of shear walls, so we were able to advise if the proposed changes were viable. By giving an indication of what works were required prior to them being adopted into the scheme, we ensured that the costs were proportionate to the benefit.

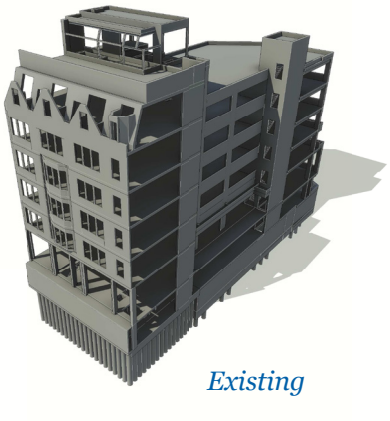
The new floor levels were intended to be mostly exposed structure with no ceilings, the design was reviewed for different materials and arrangements in collaboration with the architect before deciding to progress with the steel frame option. Consideration needed to be given for the weight of each scheme and how it would impact the existing structure as well as the appearance.

We also provided input into the development of the façade. The initial proposals were to continue the folds further down the building, however, we identified that this would require additional cutting and strengthening works to the slab at the existing floor level. We therefore proposed an alternative to keep the alignment to the existing fifth floor level before adapting to allow the columns from the new structure to align with the columns in the façade.

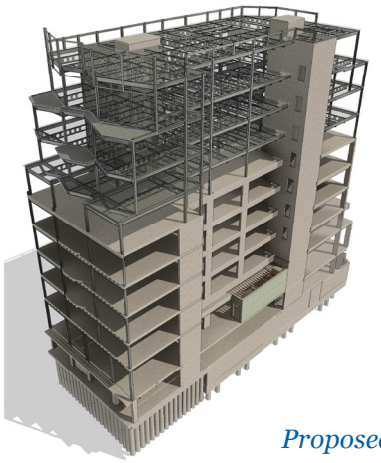
Sustainability

Frankham evaluated the efficiency of the structure in terms of weight and embodied carbon while reviewing the options to inform our decision. Where strengthening was required, carbon fibre reinforcement was utilised to minimise the impact spatially and provide a more sustainable option than alternative steel or concrete solutions.

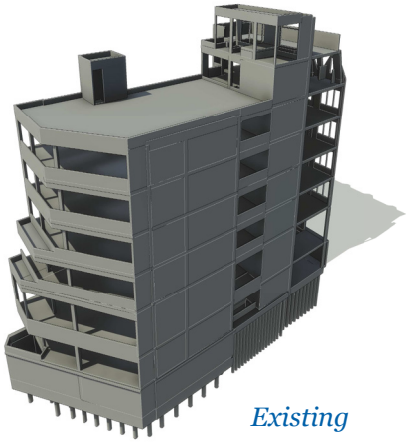
Information on the mass of retained and proposed materials was provided to the sustainability consultant to assist with the sustainability statement. We also provided information on the volume of materials and details of how the recycled content of the proposed materials could be improved by using ground granulated blast-furnace slag (GGBS), recycled aggregates and the UK CARES scheme.



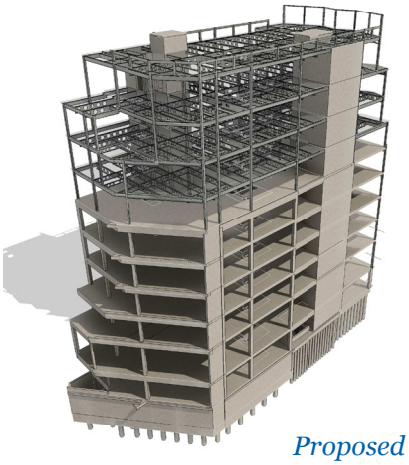
Existing



Proposed



Existing



Proposed

Challenges

The additional floors required the existing building to be modelled and checked for capacity, including the existing piles. The as-built drawings were available which included the reinforcement details and information about pile capacities. We achieved this by producing a 3D analytical model which was generated to match the existing structure as closely as possible.

The size of the mechanical ventilation for the new office spaces was significant and difficult to accommodate with the floor to ceiling heights allowed for in the planning application. To provide the optimal floor to ceiling height for the office space, cellular beams were used which allowed the structural and service zones to overlap. This option also provided an aesthetic solution to the alignment of the services and structure in the exposed areas of the office space.

The building occupies most of the site, leaving no space for surface water attenuation at ground level. Our solution for that was to create attenuation in the form of a blue roof which stores rainwater prior to allowing a slow rate of discharge. This is much heavier than a typical roof which presented a challenge in terms of ensuring the capacity of the existing structure to support these loads.

Knowledge Sharing & Continuous Improvement

The experience gained and research undertaken when reviewing the embodied carbon for this project has been shared within the team by creating a library of documents on the subject. This has enabled us to maximise the benefit of the lessons learnt on this project and apply them to subsequent projects to provide sustainable solutions.

Bringing ideas
to life.