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Brief Review of the Structural Steels introduced in 2008 and the potential to reduce their size

to accompany
Planning and Listed Building Consent Application
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This report is a brief overview of the potential works required to reduce the size of the beams introduced at u/s first and u/s ground, which are supported on columns founded at lower ground. The reason to reduce the size of the steel at u/s first and the partial removal of the wall with an introduction of a new steel at u/s second is to reopen the spaces further so that the historic plan form can be more easily read. It has been produced by Tom Schollar, of Samuely Consulting Structural Engineers and Natasha Brown of Giles Quarme & Associates.

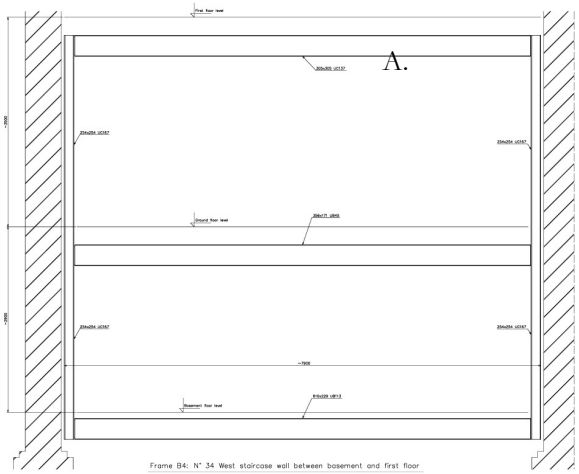
Lower Ground Floor

The beam at underside of ground is currently a 356 x 171 UB 45 and it could be replaced by a 254 x 254 UC 73 section. (So the beam could be about 100mm less deep than it is at present.) t may also be possible to gain more headroom still by raising the beam in addition to changing the size - one would need to open up to determine this.

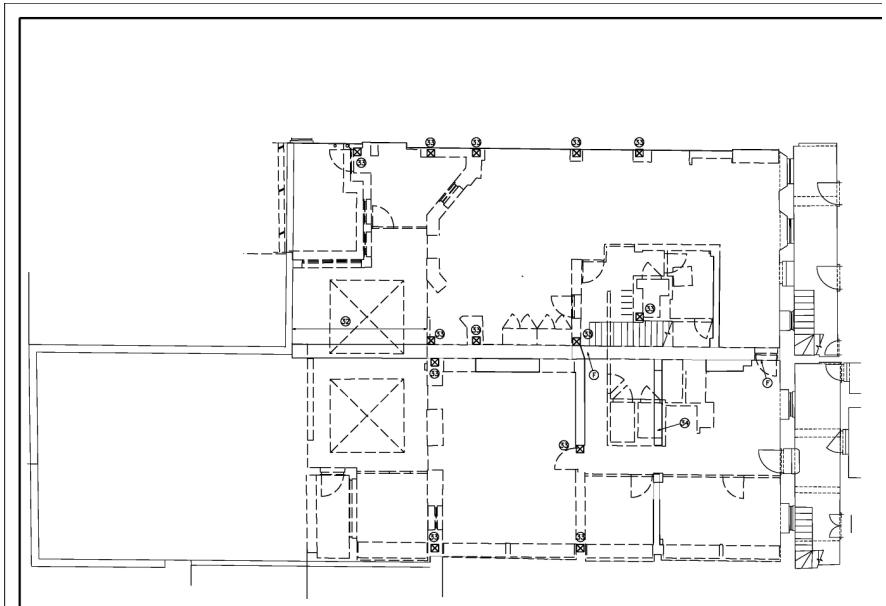
Ground Floor

The beam at underside of first is currently a 305 x 305 UC 137 and it is designed with "fixed" connections to the supporting 254 x 254 UC 167 columns. (A on the section) The effect of using "fixed" connections, rather than "pinned", was to reduce the size of the beam and reduce deflections. It does increase the size of the supporting columns, however. It will be technically possible to raise the height of the beam. Please see photo taken during the 2008 works. The photo shows the steel beam set under the brick piers at first floor. These beams are supported by temporary propping down to the lower ground floor. The third photo shows the steel beam installed below the timber beams. There is a space of about 150mm, (2 bricks) and the steel beam could be raised by this much to get the beams higher. As the wall above is to be partially removed between first and u/s second, the beam could be reduced to a 254 x 254 UC 73, however, and it would be relatively straightforward to raise it up, because the weight from above would have been removed. The columns would need additional pieces fixed to allow the raising of the beam.

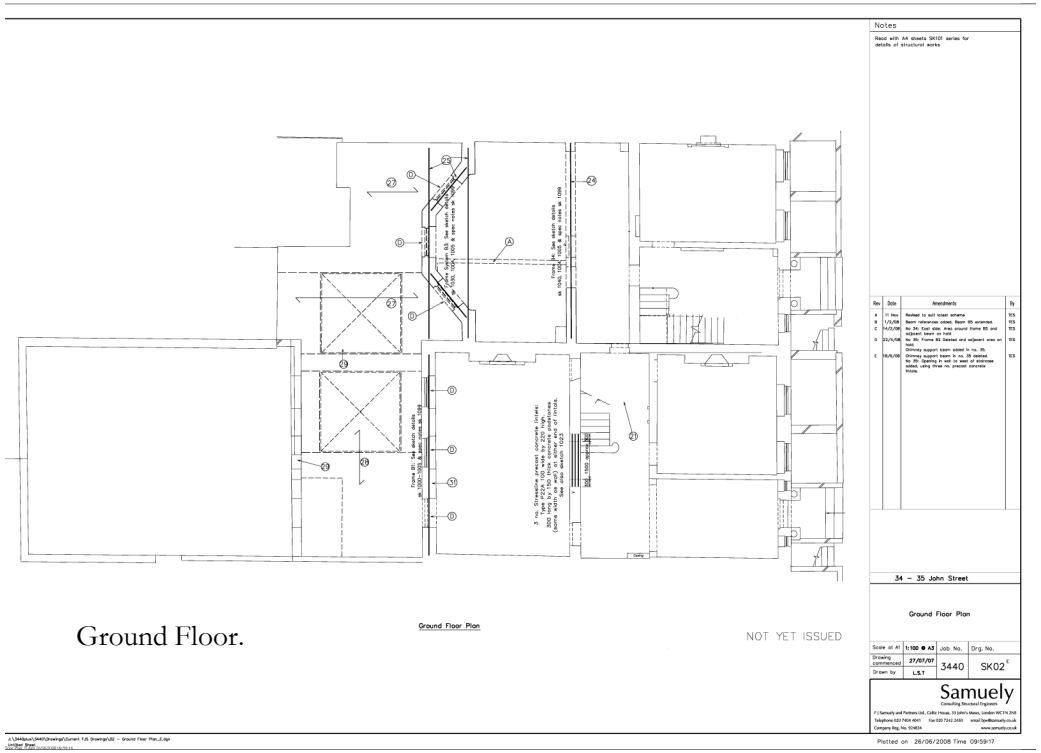
Steel at u/s first floor during construction in 2008-9.



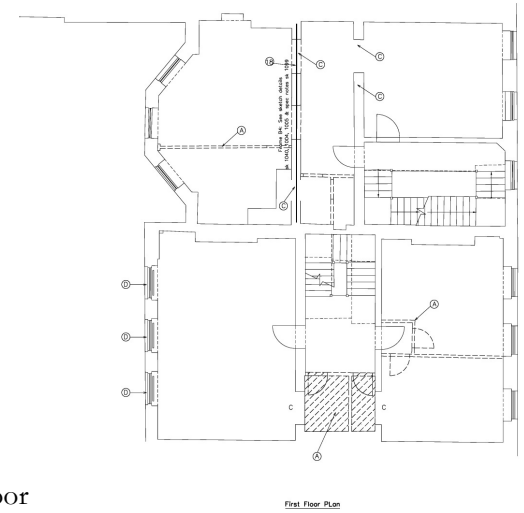
Section showing steel at u/s first and u/s ground connected to the concrete slab during construction in 2008-9.



Lower Ground Floor.



Ground Floor.



First Floor

Samuely Consulting Structural Engineers drawings from the 2008 works. These drawings illustrate where the existing steels were installed at Lower Ground, Ground and First floors.

First Floor

With the wall between first and second, being partially removed to open up the space so that the historic plan of the rear first floor room can be more easily understood then a beam at underside of second will need to be installed. Thee wall between second and third floor will remain unchanged and therefore this beam will need to be a 305 x 305 UC 198.

We will retain small nib walls between first and second floor and will only install columns to join up with the columns below if the brickwork is shown to be in poor condition and not capable of carrying the loads.

Basement

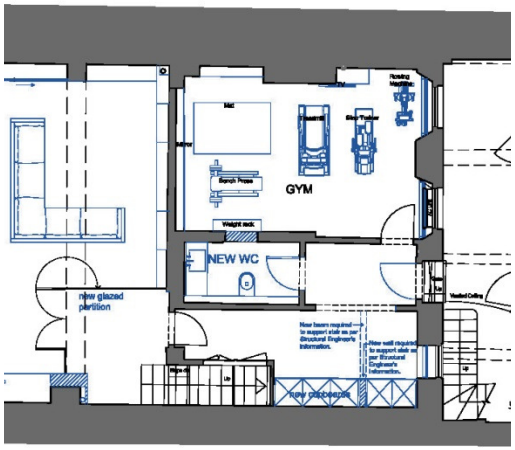
At basement the walls that were introduced during the construction of the 2008 works will be re-ordered to provide a more open space at the front of the property, as was the case prior to the 2008 works. If possible a steel will not be introduced in place of the walls, but if one is required then a small steel will be introduced, as indicated on the Architect's drawings.

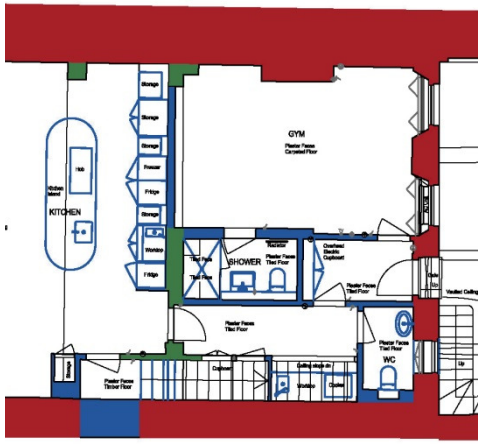
Conclusion

In conclusion the simplification and the reduction of the larger obtrusive steel in the ground floor by approximately half its depth will be a large benefit to the understanding and reading of this historic room. The removal of the walls at first floor that currently subdivide the historic single room will benefit the understanding of this room.

T.Schollar & N. Brown April 2017.

Walls at first floor during construction in 2008-9.





GQA current proposals and the historic evolution plan showing the 21st century work in blue.