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HARCOURT HOUSE
16-17 HARINGEY PARK
HORNSEY
LONDON N8 9JB

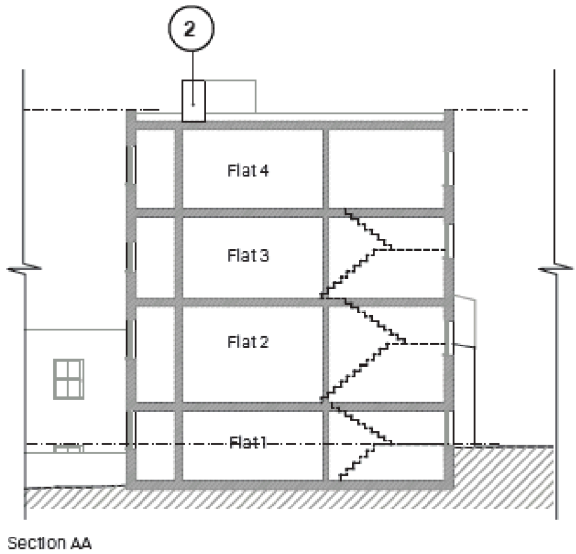
2nd May 2024

LONDON BOROUGH OF HARINGEY
Planning Application - HGY/2024/0921

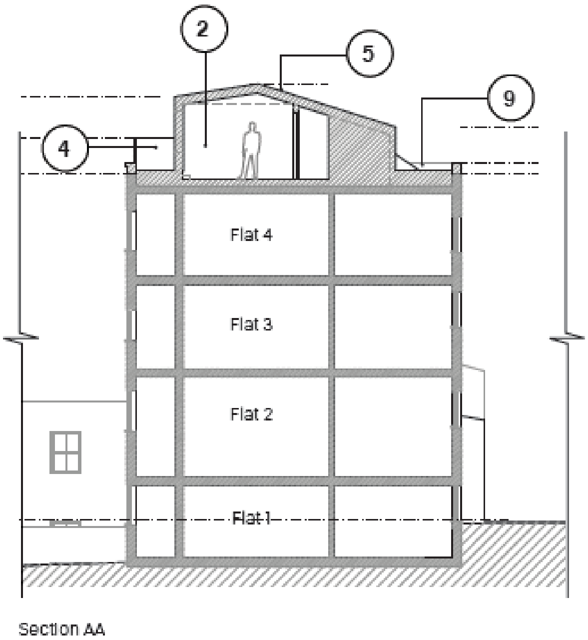
Comments on the proposed structural alterations required to achieve the proposed development at Harcourt House, 16 – 17 Haringey Park:

1. Disproportionate Collapse

The existing building was formerly Victorian houses that were extended and converted into flats. The building structure comprises load bearing masonry walls and timber joisted floors and roof.



Existing building condition
4 storey building



Proposed building condition
5 storey building

Refer to the following pages.
Extracts of Building Regulations 2013. Section A3 Disproportionate Collapse

Refer to Table 11
In its current condition, the building falls under consequence class 2a.
In the proposed condition the building moves into consequence class 2b.

Refer to Clause 5.1d
Changing the consequence class of the building from class 2a to class 2b will require the need to introduce effective horizontal ties and effective vertical ties throughout the building structure.
This is impossible to achieve without causing major disruptions to the flat demises on the floors below.

The Requirement

This Approved Document deals with the following Requirements which are contained in the Building Regulations 2010.

Requirement	*Limits on application*
Disproportionate collapse **A3.** The building shall be constructed so that in the event of an accident the building will not suffer collapse to an extent disproportionate to the cause.	

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A3

Guidance

Performance

In the Secretary of State's view the Requirement of A3 will be met by an appropriate choice of measures to reduce the sensitivity of a building to disproportionate collapse should an accident occur.

Introduction

0.1 The guidance in Section 5 deals with the means of meeting this performance criterion.

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Section 5: Reducing the sensitivity of the building to disproportionate collapse in the event of an accident

5.1 The requirement will be met by adopting the following approach for ensuring that the building is sufficiently robust to sustain a limited extent of damage or failure, depending on the consequence class of the building, without collapse.

a. Determine the building's consequence class from Table 11.

b. **For Consequence Class 1 buildings** – Provided the building has been designed and constructed in accordance with the rules given in this Approved Document, or other guidance referenced under Section 1, for meeting compliance with Requirement A1 and A2 in normal use, no additional measures are likely to be necessary.

c. **For Consequence Class 2a buildings** – In addition to the Consequence Class 1 measures, provide effective horizontal ties, or effective anchorage of suspended floors to walls, as described in the Standards listed under paragraph **5.2** for framed and load-bearing wall construction (the latter being defined in paragraph **5.3** below).

d. **For Consequence Class 2b buildings** – In addition to the Consequence Class 1 measures, provide effective horizontal ties, as described in the Standards listed under paragraph **5.2** for framed and load-bearing wall construction (the latter being defined in paragraph **5.3** below), together with effective vertical ties, as defined in the Standards listed under paragraph **5.2**, in all supporting columns and walls.

Alternatively, check that upon the notional removal of each supporting column and each beam supporting one or more columns, or any nominal length of load-bearing wall (one at a time in each storey of the building), the building remains stable and that the area of floor at any storey at risk of collapse does not exceed 15% of the floor area of that storey or $100m^2$, whichever is smaller, and does not extend further than the immediate adjacent storeys (see Diagram 24).

Where the notional removal of such columns and lengths of walls would result in an extent of damage in excess of the above limit, then such elements should be designed as a 'key element' as defined in paragraph **5.3** below.

e. **For Consequence Class 3 buildings** – A systematic risk assessment of the building should be undertaken taking into account all the normal hazards that may reasonably be foreseen, together with any abnormal hazards.

Critical situations for design should be selected that reflect the conditions that can reasonably be foreseen as possible during the life of the building. The structural form and concept and any protective measures should then be chosen and the detailed design of the structure and its elements undertaken in accordance with the recommendations given in the Standards given in paragraph **5.2**.

Further guidance is given in Annexes A and B to BS EN 1991-1-7:2006 Eurocode 1: Actions on structures – Part 1.7: General actions – Accidental actions; with UK National Annex to BS EN 1991-1-7:2006 and BS EN 1990:2002+A1:2005 Eurocode – Basis of structural design; with UK National Annex to BS EN 1990:2002+A1:2005.

5.2 Details of the effective horizontal and vertical ties including tie force determination, together with the design approaches for checking the integrity of the building following the notional removal of vertical members and the design of key elements, are given in the following Standards:

BS EN 1990:2002+A1:2005 Eurocode – Basis of structural design; with UK National Annex to BS EN 1990:2002+A1:2005

BS EN 1991-1-7:2006 Eurocode 1: Actions on structures – Part 1.7: General actions – Accidental actions; with UK National Annex to BS EN 1991-1-7: 2006 and BSI PD 6688-1-7: 2009

BS EN 1992-1-1:2004 Eurocode 2: Design of concrete structures – Part 1.1: General rules and rules for buildings; with UK National Annex to BS EN 1992-1-1:2004 and BSI PD 6687-1:2010

BS EN 1993-1-1:2005 Eurocode 3: Design of steel structures – Part 1.1: General rules and rules for buildings; with UK National Annex to BS EN 1993-1-1:2005

BS EN 1994-1-1:2004 Eurocode 4: Design of composite steel and concrete structures – Part 1.1: General rules and rules for buildings; with UK National Annex to BS EN 1994-1-1:2004

BS EN 1995-1-1:2004+A1:2008 Eurocode 5: Design of timber structures – Part 1.1: General – Common rules and rules for buildings; with UK National Annex to BS EN 1995-1-1:2004+A1:2008 and BSI PD 6693-1:2012

BS EN 1996-1-1:2005+A1:2012 Eurocode 6: Design of masonry structures – Part 1.1: General rules for reinforced and unreinforced masonry structures; with UK National Annex to BS EN 1996-1-1:2005+A1:2012 and BSI PD 6697:2010

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A3 REDUCING THE SENSITIVITY OF THE BUILDING TO DISPROPORTIONATE COLLAPSE IN THE EVENT OF AN ACCIDENT

BS EN 1999-1-1:2007+A1:2009 Eurocode 9: Design of aluminium structures – Part 1.1: General structural rules; with UK National Annex to BS EN 1999-1-1:2007+A1:2009 and BSI PD 6702-1:2009

5.3 Definitions

Nominal length of load-bearing wall

The nominal length of load-bearing wall construction referred to in **5.1d** should be taken as follows:

- in the case of a reinforced concrete wall, the distance between lateral supports subject to a maximum length not exceeding 2.25H,
- in the case of an external masonry wall, or timber or steel stud wall, the length measured between vertical lateral supports,
- in the case of an internal masonry wall, or timber or steel stud wall, a length not exceeding 2.25H,

where H is the storey height in metres.

Note: Annex A of BS EN 1991-1-7:2006 with its UK National Annex provides corresponding guidance.

Key elements

A 'key element', as referred to in paragraph **5.1d**, should be capable of sustaining an accidental design loading of 34kN/m^2 applied in the horizontal and vertical directions (in one direction at a time) to the member and any attached components (e.g. cladding etc.) having regard to the ultimate strength of such components and their connections. Such accidental design loading should be assumed to act simultaneously with all other design loadings (i.e. wind and imposed loading) in accidental actions loading combination.

Table 11 **Building consequence classes**

Consequence Classes	Building type and occupancy
1	Houses not exceeding 4 storeys
	Agricultural buildings
	Buildings into which people rarely go, provided no part of the building is closer to another building, or area where people do go, than a distance of 1.5 times the building height
2a Lower Risk Group	5 storey single occupancy houses
	Hotels not exceeding 4 storeys
	Flats, apartments and other residential buildings not exceeding 4 storeys
	Offices not exceeding 4 storeys
	Industrial buildings not exceeding 3 storeys
	Retailing premises not exceeding 3 storeys of less than 2000m^2 floor area in each storey
	Single-storey educational buildings
	All buildings not exceeding 2 storeys to which members of the public are admitted and which contain floor areas not exceeding 2000m^2 at each storey
2b Upper Risk Group	Hotels, blocks of flats, apartments and other residential buildings greater than 4 storeys but not exceeding 15 storeys
	Educational buildings greater than 1 storey but not exceeding 15 storeys
	Retailing premises greater than 3 storeys but not exceeding 15 storeys
	Hospitals not exceeding 3 storeys
	Offices greater than 4 storeys but not exceeding 15 storeys
	All buildings to which members of the public are admitted which contain floor areas exceeding 2000m^2 but less than 5000m^2 at each storey
	Car parking not exceeding 6 storeys
3	All buildings defined above as Consequence Class 2a and 2b that exceed the limits on area and/or number of storeys
	Grandstands accommodating more than 5000 spectators
	Buildings containing hazardous substances and/or processes

Notes:

1. For buildings intended for more than one type of use the Consequence Class should be that pertaining to the most onerous type.
2. In determining the number of storeys in a building, basement storeys may be excluded provided such basement storeys fulfil the robustness requirements of Consequence Class 2b buildings.
3. BS EN 1991-1-7:2006 with its UK National Annex also provides guidance that is comparable to Table 11.

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BS EN 1990:2002+A1:2005 with its UK National Annex provides guidance on accidental design loading and accidental actions loading combination for 'key elements' and expressions 6.11a and 6.11b of that Standard are relevant.

Note: Annex A of BS EN 1991-1-7:2006 with its UK National Annex provides corresponding guidance for 'key elements'.

Load-bearing construction

For the purposes of this Guidance the term 'load-bearing wall construction' includes masonry cross-wall construction and walls comprising close centred timber or lightweight steel section studs.

Alternative approach

5.4 As an alternative to Table 11, for any building which does not fall into the classes listed under Table 11, or for which the consequences of collapse may warrant particular examination of the risks involved, performance may be demonstrated using the recommendations given in the following Reports and Publication:

'*Guidance on Robustness and Provision against Accidental Actions*', dated July 1999.

'*Proposed Revised Guidance on meeting Compliance with the requirements of Building Regulation Part A3*'. Revision of the Allott and Lomax proposals. Project Report No. 205966.

Both of the above documents are available on www.planningportal.gov.uk

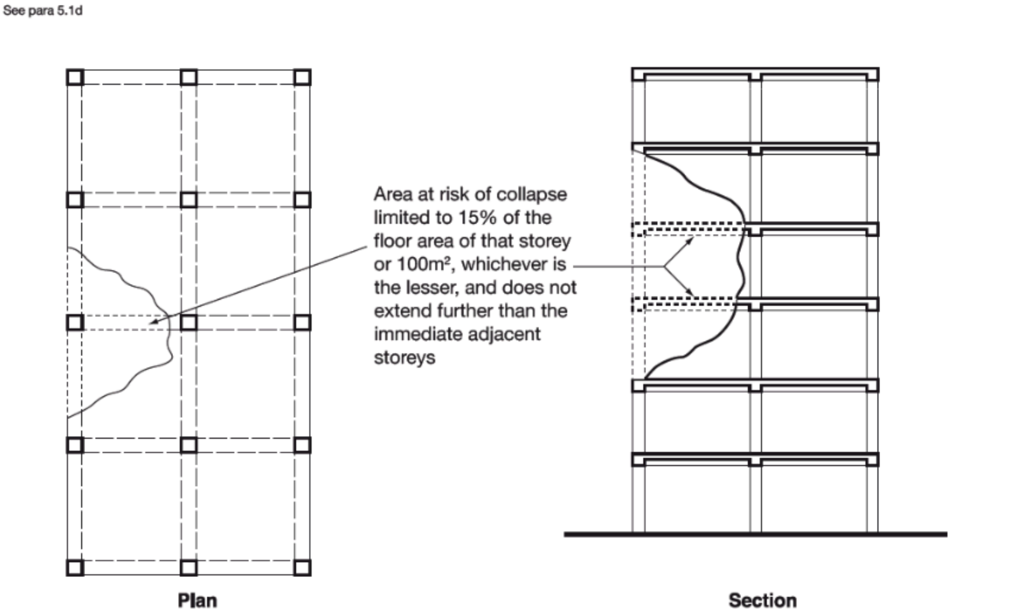
'*Practical Guide to Structural Robustness and Disproportionate Collapse in Buildings*' dated October 2010. Published by The Institution of Structural Engineers, London.

Seismic design

5.5 Seismic design is not usually required for buildings classified by Table 11 as being in Consequence Classes 1, 2a and 2b. For buildings classified as Consequence Class 3 the risk assessment should consider if there is any need to carry out seismic design, although such a need is not an explicit requirement for these buildings.

Diagram 24 **Area at risk of collapse in the event of an accident**

See para 5.1d



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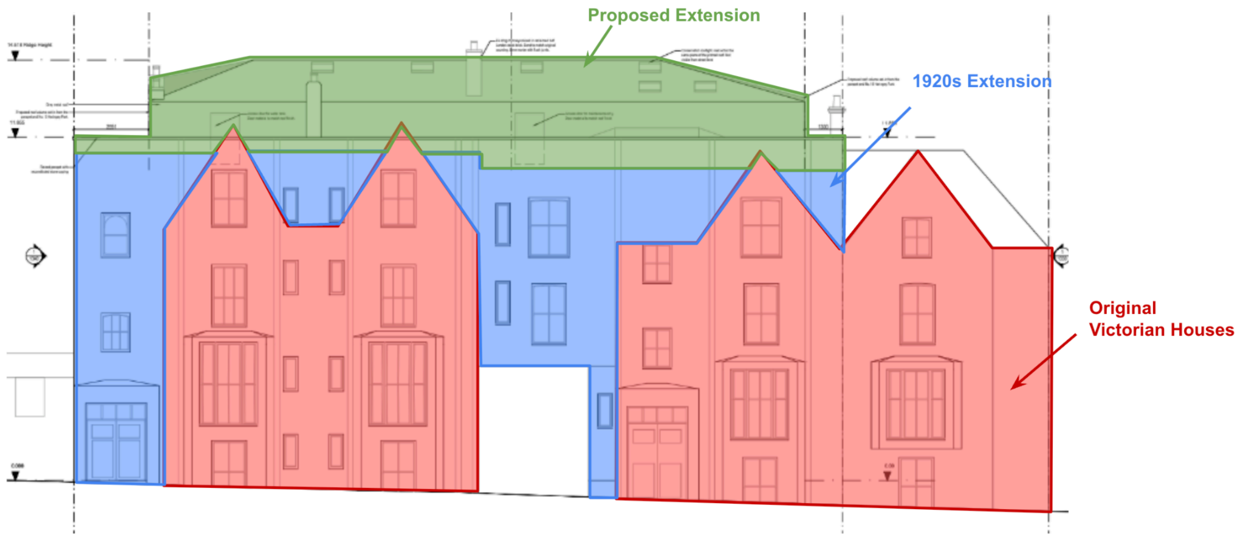
2. Foundation loads



Extract from the DAS marked up to indicate the original Victorian houses and the 1920s extensions

The original Victorian houses were converted into flats and an additional floor of accommodation was added to the top to create the 4th floor. When the extension was added to the top of the building, the loading onto the walls and foundations of the building were increased.

The current proposal is to add an additional floor to the building structure which will increase the loading on the building's foundations even further.

It is generally accepted that foundation loads of existing structures can be increased by up to 10% without causing large settlements and without overstressing the ground at the foundations' formation level.

The combined effect of the 1920s extensions and the proposed extension will be to increase the loading onto the foundations by well in excess of 10% compared to the pre- 1920 foundation loads.

An exercise will have to be carried out to establish the following,

- The existing foundation types and size
- The bearing pressure under the existing foundations
- The bearing capacity of the ground under the foundations.

Once this exercise is carried out, the conclusion is very likely to be that the existing foundations will require modifications to ensure that the bearing pressure under the foundations is less than the bearing capacity of the ground.

Carrying out modifications to the foundations will require excavation and will cause major disruption to the occupied flat demises on the lower ground floor.

Strengthening of the external walls may be required and will impact the appearance of the building as works cannot be carried out internally due to the flats being occupied.

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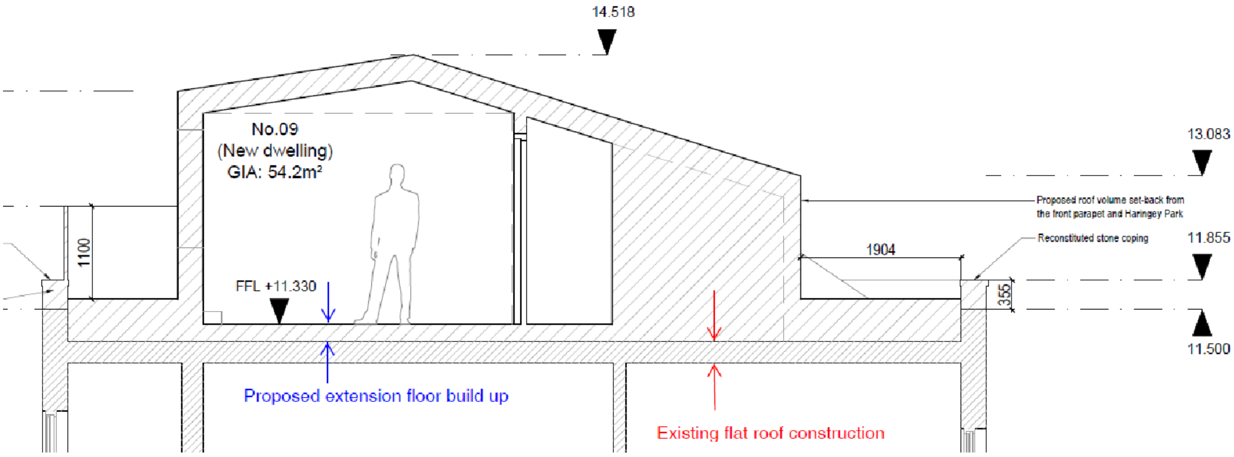
3. Extension floor build up / construction detail



Extract from the Planning drawings
Section of the proposed extension

The design load of the existing roof will be for snow loading (circa 0.6 kN/m^2). The design load of the proposed new floors of the extension will be 1.5 kN/m^2 (plus the loading of the partition walls.

It is unlikely that the existing roof rafters / joists will be capable of supporting this larger loading. The section of the proposed extension also suggests that the loading of the extension roof and walls will land onto the existing roof further increasing the loading onto the roof.

The structural solution for the new extension will have to be a new independent floor structure above the existing roof spanning onto the load bearing walls without loading the existing roof rafters / joists.

The overall thickness of the new independent floor structure will be much larger than the thickness indicated on the sections in the Planning Application drawings. The independent floor structure will require beams that are in the region of 350mm to 400 mm deep to span the distances required which will push the ridge of the extension materially higher than indicated on the drawings.

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