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Planning. Design. Economics.

Daylight and Sunlight Assessment

Nos. 33-35 Grafton Way

Prepared on behalf of Mr P Loucaides

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Introduction

This report considers the effects of the proposed development at Nos. 33-35 Grafton Way on the daylight and sunlight levels received by neighbouring residential dwellings. It also considers the levels of natural light that will be experienced within the proposed residential units and bedsit accommodation within No. 33 Grafton Way. It has been prepared on behalf of Mr Loucaides.

The proposed development comprises the conversion of No. 33 Grafton Way to provide enhanced bedsit accommodation at first floor level and an enlarged residential unit within the building's upper floors. The development includes a roof level extension and rear addition.

The assessment considers the impacts of the proposed development on existing residential properties on Tottenham Court Road, as well as the proposed units.

The quantitative assessment has been undertaken in accordance with the guidelines set out in the Building Research Establishment (BRE) report "*Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice*" (2011). The Guide is intended to be advisory and does not contain mandatory standards. The introduction states:

"The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly because natural lighting is only one of many factors in site layout design."

This assessment considers the impacts of the development in terms of daylight and sunlight. It does not address rights to light, which is a legal matter rather than a planning consideration.

This assessment has been carried out using the following information:

- Ordnance Survey Superplan digital mapping;
- Aerial Photography of the site and surroundings;
- UPB Architects drawings of the proposed development;
- Detailed site observations.

The report is divided into the following subsequent sections:

- Section 2.0 provides a brief description of the site and surroundings and the nature of the proposed development, highlighting features of relevance to the assessment of daylight and sunlight levels;
- Section 3.0 provides an outline of the scope of the assessment;
- Section 4.0 sets out relevant planning policy considerations;
- Section 5.0 provides an assessment of the development's effects in terms of daylight;

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- Section 6.0 describes the assessment of the proposal's sunlighting effects;
 - Section 7.0 provides a summary of the assessment and sets out our conclusions.

1.8

The assessment is supported by appendices illustrating the assessment model, the locations of the window reference points assessed and the parameters used in the calculations. These are attached at Appendices 1-3.

Site, Surroundings and the Proposal

Site and Surroundings

- 2.1 No. 33 Grafton Way comprises a four storey former townhouse. It forms part of a terrace fronting the southern side of the Grafton Way between Tottenham Court Road and Fitzroy Square. The site is surrounded by a mix of retail units, commercial premises and residential accommodation on Grafton Way, Tottenham Court Road and Midford Place.

The Proposed Development

- 2.2 The proposed development comprises the conversion and extension of No. 33 Grafton Way to provide enhanced bedsit accommodation at first floor level and an enlarged residential unit within the building's upper floors. A small scale roof level addition will be introduced to the rear of the roof and a rear extension will be created.
- 2.3 The layout and configuration of the proposed development is shown in the model images attached at Appendix 1. The scheme is illustrated in greater detail in the submitted application drawings and is described in the Design and Access Statement.

3.0 Scope of Assessment

- 3.1 The assessment has provided an analysis of the impacts of the development on neighbouring residential accommodation and the levels of natural light received by the proposed residential units. The following provides an overview of the window reference points and rooms assessed within neighbouring properties and the proposed units.

Neighbouring Properties Assessed

- 3.2 As set out at Section 2.0, the site is surrounded by buildings in a mix of retail, commercial and residential uses. Taking account of the position and scale of the proposed roof level and rear additions, the residential accommodation situated to the north of the site on Grafton Way will be unaffected by the proposals (i.e. as the roof extension will not subtend an angle of more than 25 degrees from opposing windows serving residential units they do not require assessment under the BRE guidance).
- 3.3 The neighbouring accommodation adjacent to the site at No. 118 Tottenham Court Road and No. 31 Grafton Way is non residential in use, while the neighbouring buildings to the west of the site will be unaffected by the proposed extensions (i.e. the windows set in their rear elevations are on the same plane as the proposed extension). Similarly, the buildings opposite the site on Midford Place are entirely non residential in use.
- 3.4 The neighbouring residential properties on Tottenham Court Road have, therefore, formed the focus of the assessment as these comprise the only windows in the vicinity of the site which serve residential accommodation and could potentially be affected by the development in terms of their natural light levels.
- 3.5 In summary, the assessment has considered the impacts of the proposed development on the following neighbouring properties and their windows:
- No. 117 Tottenham Court Road – Rear windows at first second and third floor levels;
 - No. 116 Tottenham Court Road – Rear windows at first second and third floor levels;
 - No. 115 Tottenham Court Road – Rear window at third floor level.
- 3.6 Overall, the assessment has considered the effects of the proposed development on 7 x no. first, second and third floor level windows serving neighbouring residential properties. The windows selected for assessment comprise those that could potentially be affected by the proposed development and are representative of the scheme's impacts on other neighbouring windows serving residential properties. The assessment of these windows enables conclusions to be drawn regarding the overall effects of the development on the area's other residential properties.

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- 3.7 All of the above windows have been assessed in terms of daylighting (Vertical Sky Component). These windows are all situated to the south of the site and do not require assessment in terms of sunlight availability under the BRE guidance.
- 3.8 Planning permission has recently been approved for the introduction of a rear extension and stairwell to No. 117 Tottenham Court Road. While this extension has not yet been implemented, we have modelled the addition and included it in the assessment (i.e. a worse case scenario approach has been adopted).
- 3.9 The locations of the window reference points assessed are illustrated in the plans attached at Appendix 1.

Proposed Residential Units Assessed

- 3.10 In addition to the analysis of the scheme's impacts on neighbouring properties, the assessment has considered the levels of natural light that will be received by the proposed residential units and bedsit accommodation within No. 33 Grafton Way. The development will include two bedsit units at first floor level and a residential unit at second and third floor levels. The main rooms and bedrooms within this accommodation have all been assessed (including the communal kitchens serving the bedsit units). This constitutes six rooms served by 12 windows. Three of these windows are orientated within 90 degrees of due south and require assessment in relation to sunlight availability. The remaining windows have been assessed in terms of daylighting only.

4.0 Planning Policy Context

- 4.1 The development plan covering the site comprises the Council's Local Development Framework (2010). Relevant policies are outlined below:
- 4.2 Policy CS9 of the LDF Core Strategy DPD states that the Council will protect residential amenity in Central London.
- 4.3 Policy DP26 of the LDF Development Policies DPD addresses managing the impact of development on occupiers and neighbours. It states that the Council will seek to protect the quality of life of occupiers and neighbours in terms of amenity, including daylight and sunlight levels. The accompanying text indicates that the BRE guide will form the basis for assessment of a development's daylight and sunlight impacts.
- 4.4 The Council's CPG (Housing) (2011) also states that new development should be designed to maximise daylight and sunlight levels.

Daylight

This section of the assessment considers the impacts of the proposed development on the levels of daylight received at the aforementioned window reference points.

Methodology

The daylight assessment relating to neighbouring properties has been based on analysis of the Vertical Sky Component (VSC) levels received by their windows. The assessment of the levels of natural light experienced within the proposed units has been based on analysis of both VSC and Average Daylight Factor (ADF) as the additional parameters required for more detailed internal daylight calculations to be carried out are known.

The following sets out the methodology employed in the daylight assessment.

Vertical Sky Component

The level of ambient daylight received by a window is quantified in terms of its vertical sky component (VSC), which represents the amount of vertical skylight falling on a vertical window. The daylight assessment has been based on three dimensional AutoCAD models constructed for the site and surroundings as existing and with the proposed development in place.

The heights and locations of the surrounding buildings and the proposed development have been taken from Ordnance Survey digital plan data, site observations, aerial photography of the site and surroundings and drawings produced by UPB Architects.

The VSC level at each of the windows requiring assessment has been quantified using Waldram Tools daylight and sunlight software (MBS Software Ltd).

The BRE good practice guide outlines numerical guidelines that represent flexible targets for new developments in relation to the vertical sky component at nearby reference points. The document states that:

*“If the vertical sky component, with the new development in place, is **both** less than 27% **and** less than 0.8 times its former value, then the loss of light is likely to be noticeable.” (our emphasis)*

The guidelines therefore require that **either** the VSC target **or** the degree of change in daylighting are met (i.e. if the 27% target is adhered to, there is no requirement under the BRE guidelines for the resultant VSC level to remain at 0.8 times the former VSC level).

Average Daylight Factor

5.9 Where the BRE VSC targets are not met by a window, the BRE guide advises that the calculation of Average Daylight Factor (ADF) provides an alternative means of assessing the level of daylight received by the interior of the room served by a window. The calculation of ADF provides a more accurate and robust method of calculating the daylight level experienced within a room as it takes into account the size and reflectance of room's surfaces and the number, size and transmittance of its window(s), as well as the ambient daylight level (VSC) received at the window(s).

5.10 The Average Daylight Factor (df) is defined as the average internal illuminance as a percentage of the unobstructed external illuminance under standard overcast conditions.

5.11 ADF can be calculated using the following formula:

$$df = \frac{TA_w \theta}{A(1-R^2)} \quad \%$$

Where:

- T is the diffuse visible transmittance of the glazing (a value of 0.6 is typical for double glazed clear glass);
- A_w is the net glazed area of the window (m²);
- θ is the angle of visible sky in degrees;
- A is the total area of the room surfaces: ceiling, floor, walls and windows (m²);
- R is the average reflectance (a value of 0.5 is recommended by the BRE for fairly light rooms).

5.12 Where a room is served by more than one window, the following formula applies:

$$df = \frac{(T_1 A_{w1} \theta_1) + (T_2 A_{w2} \theta_2) + (T_3 A_{w3} \theta_3) \dots}{A(1-R^2)} \quad \%$$

Where:

- T_{1, 2, 3} is the diffuse visible transmittance of the glazing for window 1 (a value of 0.6 is typical for double glazed clear glass);
- A_{w1, 2, 3} is the net glazed area of window 1(m²);
- θ_{1, 2, 3} is the angle of visible sky in degrees for window 1;
- A is the total area of the room surfaces: ceiling, floor, walls and windows (m²);
- R is the average reflectance (a value of 0.5 is recommended by the BRE for fairly light rooms).

5.13

The approach to assessing internal daylighting using the ADF method is set out at Appendix C of the BRE guide. The BRE guide and British Standard BS8206 set the following minimum recommended ADF levels for different room types:

- Kitchens: 2%;
- Living rooms: 1. 5%;
- Bedrooms: 1%.

Results

5.14

The following sets out the results if the external and internal daylight analyses.

Effects on neighbouring properties

5.15

The following table contains the VSC results obtained for the neighbouring residential properties requiring assessment on Tottenham Court Road.

Address	Floor	Existing VSC	Resultant VSC	Change	Above/Below BRE Guide
			BRE Guide: 27%	BRE Guide: 0.8	
No. 117 Tottenham Court Road	First	21.03%	20.97%	1.00	Above
No. 117 Tottenham Court Road	Second	25.38%	25.38%	1.00	Above
No. 117 Tottenham Court Road	Third	30.85%	30.44%	0.99	Above
No. 116 Tottenham Court Road	First	22.76%	22.66%	1.00	Above
No. 116 Tottenham Court Road	Second	30.97%	30.76%	0.99	Above
No. 116 Tottenham Court Road	Third	36.96%	36.88%	1.00	Above
No. 115 Tottenham Court Road	Third	36.09%	36.09%	1.00	Above

Table 5.1: VSC Results for the Neighbouring Windows Assessed

5.16 The results of the daylight analysis demonstrate that the ambient daylight levels received by all of the windows assessed serving neighbouring residential accommodation will comply fully with the BRE VSC guide levels. The development will not result in any noticeable losses of daylight to any of the windows assessed in the terms set out by BRE guidance. In all cases, the degree of change arising from the development will be negligible

5.17 The windows assessed serve the residential units in the immediate vicinity of the site which are most likely to be affected by the development. Given that all of the windows comply fully with the BRE VSC guide levels, it is reasonable to conclude that all other neighbouring windows will also be compliant with the guide levels for VSC with the development in place.

Internal Assessment – Proposed Units

5.18 The following table provides a summary of the VSC and ADF results obtained for the proposed residential units and bedsit accommodation (the parameters used in the ADF calculations are set out in full at Appendix 3).

Floor	Room	ADF	Above/Below BS/BRE ADF guide levels
First	Kitchen (1.1)	2.28%	Above (2%)
	Front bedsit (1.2)	2.60%	Above (1.5%)
	Rear bedsit (1.3)	3.34%	Above (1.5%)
Second	Living room/kitchen (2.1)	3.44%	Above (2%)
Third	Rear bedroom (3.1)	1.07%	Above (1%)
	Front bedroom (3.2)	2.72%	Above (1%)

Table 5.2: Proposed Units – Summary of Daylight Results

5.19 The results of the ADF calculations demonstrate that all of the proposed main rooms and bedrooms within the development will comply with the British Standard ADF targets set out in the BRE guidance. As such, all of the proposed units will achieve a good standard of interior daylighting in the context of the BRE guide.

Sunlight

This section of the assessment considers the effects of the development in terms of sunlight availability. The following outlines the levels of sunlight availability that will be received by the proposed units in the development. The neighbouring properties requiring assessment for daylight are all situated to the south of the application site and do not require assessment in terms of sunlight availability.

Methodology

The levels of sunlight availability at the window reference points assessed have been calculated based on the three dimensional AutoCAD models of the site and surroundings as existing and with the development in place, using Waldram Tools software. The calculations provide the percentage year round sunlight availability and the percentage of sunlight availability received during the winter months.

The BRE good practice guide notes that:

*“If [a] window reference point can receive more than one quarter of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months between 21 September and 21 March, then the room should still receive enough sunlight...If the available sunlight hours are **both** less than the amount given **and** less than 0.8 times their former value, either over the whole year or just during the winter months (21 September to 21 March), then the occupants of the existing building will notice the loss of sunlight.” (page 11, our emphasis).*

As with daylighting, the guidelines require that **either** the sunlight availability targets **or** the degree of change in sunlighting are met (i.e. if the 25%/5% targets are adhered to, there is no requirement under the BRE guidelines for the resultant sunlight levels to remain at 0.8 times the former levels).

Results

Internal Assessment – Proposed Units

Five of the windows serving the proposed accommodation are orientated within 90° of due south and have been assessed in terms of sunlight availability

The following tables contain the annual and winter sunlight results obtained for the proposed residential units.

Floor	Window	Sunlight Availability - Resultant	Above/Below BRE Guide
		BRE Guide: 25%	
First	Rear bedsit (2.3.1)	27%	Above
Second	Living room/kitchen (3.1.4)	47%	Above
Third	Rear bedroom (3.21)	54%	Above

Table 6.1: Proposed Units – Annual Sunlight Results

Floor	Window	Sunlight Availability - Resultant	Above/Below BRE Guide
		BRE Guide: 5%	
First	Rear bedsit (2.3.1)	8%	Above
Second	Living room/kitchen (3.1.4)	15%	Above
Third	Rear bedroom (3.21)	18%	Above

Table 6.2: Proposed Units – Winter Sunlight Results

6.7

The results of the sunlight analysis for the proposed units with south facing windows show that the windows serving the first floor level bedsit accommodation and the residential unit at second and third floor levels will all be compliant with the BRE guide levels for annual and winter sunlight availability.

Summary and Conclusions

7.1 This assessment has considered the effects of the proposed development at No. 33 Grafton Way on the levels of daylight and sunlight received by neighbouring residential properties. It also considers the level of natural light that will be received within the proposed residential units and bedsit accommodation.

7.2 The assessment has been carried out in accordance with BRE guidelines relating to the analysis of daylight and sunlight.

Daylight

7.3 The assessment has considered the development's impacts on the levels of ambient daylight received by neighbouring residential properties at Nos. 115, 116 and 117 Tottenham Court Road.

7.4 The results of the daylight analysis for neighbouring properties demonstrate that all of the windows assessed will comply with the BRE VSC targets with the proposed development in place. As such, the development will not result in any noticeable reduction in the levels of natural light received by these properties in the terms set out by the BRE guidance.

7.5 The assessment has focused on the windows serving neighbouring properties that could potentially be affected by the proposed development in terms of daylight. Given their compliance with the BRE guide levels, it is reasonable to infer that the proposed development will not result in any noticeable effects on all of the area's residential properties that are located further away than those tested.

7.6 The assessment also illustrates that the main rooms and bedrooms within the proposed residential units and the bedsit accommodation will all comply with the BS/BRE guide levels for ADF. As such, the proposed units will all experience good levels of interior daylighting.

7.7 In conclusion, the proposed development complies fully with the requirements of the BRE guidance with regard to the VSC levels received by neighbouring residential properties. In addition, the proposed units will achieve interior daylight levels in excess of the BS/BRE guide levels for ADF. Consequently, the development will not give rise to any unacceptable effects in terms of daylighting received by neighbouring properties and the proposed units will experience good levels of interior daylight.

Sunlight

7.8 The sunlight analysis demonstrates that the proposed residential unit and the first floor level bedsit accommodation within No. 33 Grafton Way will experience

good levels of annual and winter sunlight availability in accordance with the BRE guidance.

Overall Conclusions

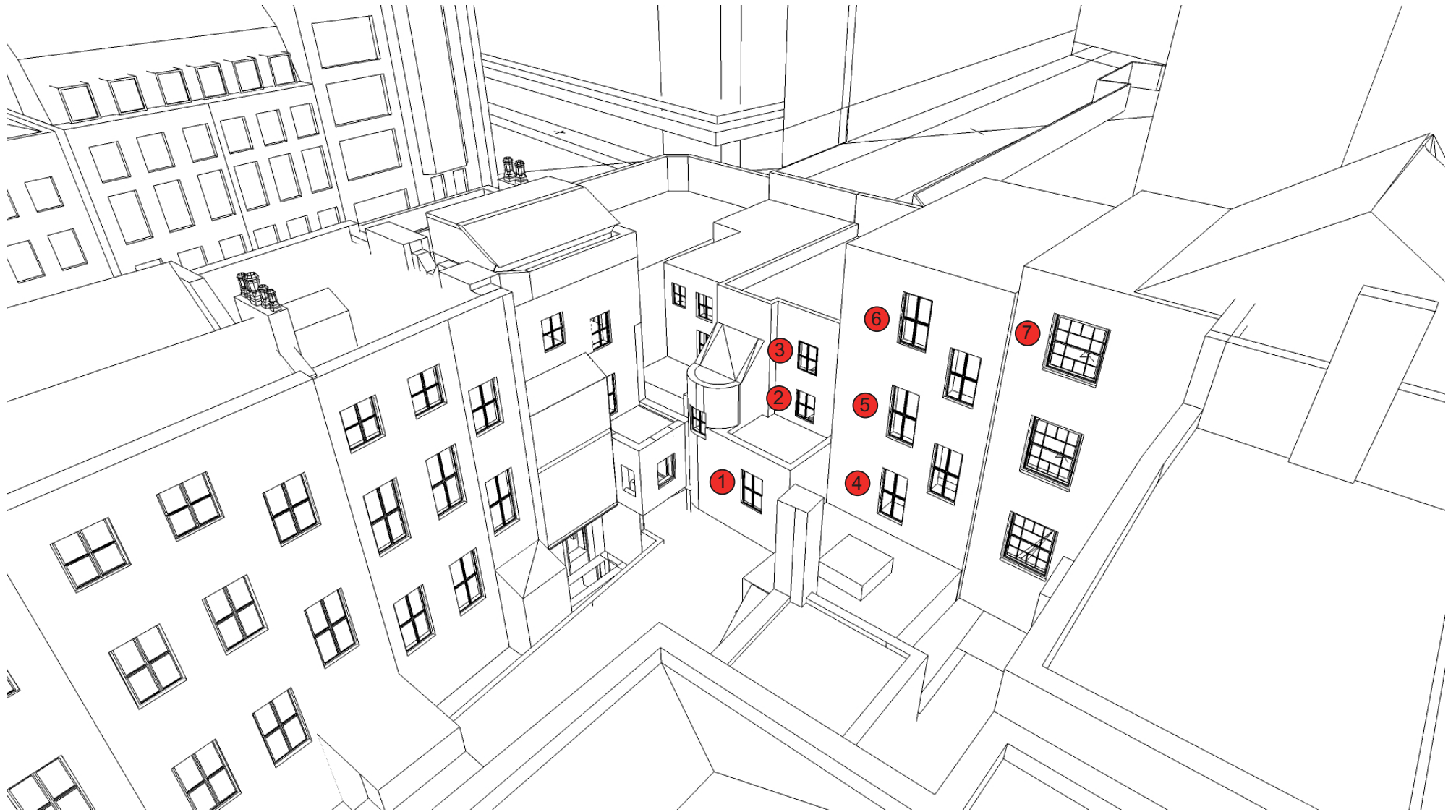
- 7.9 It is concluded that the proposed development will not give rise to any materially unacceptable daylight and sunlight effects in the context of the BRE guidance and relevant planning policy. We conclude that the scheme is entirely satisfactory in respect of daylight and sunlight, meeting the Council's policies and guidance.

Appendices

Appendix 1: Neighbouring Window References

Appendix 2: Proposed Accommodation Assessed

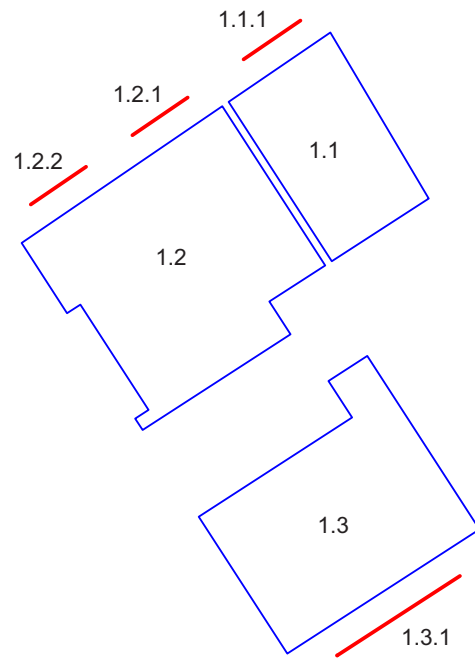
Appendix 3: ADF Parameters and Results



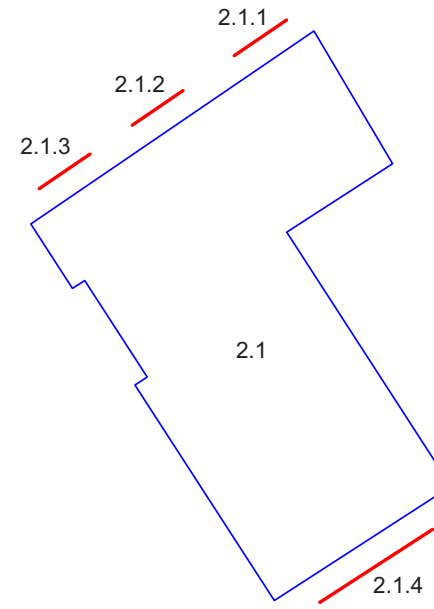
- ① 117 Tottenham Court Road, first floor W1
- ② 117 Tottenham Court Road, second floor W1
- ③ 117 Tottenham Court Road, third floor W1

- ④ 116 Tottenham Court Road, first floor W1
- ⑤ 116 Tottenham Court Road, second floor W1
- ⑥ 116 Tottenham Court Road, third floor W1

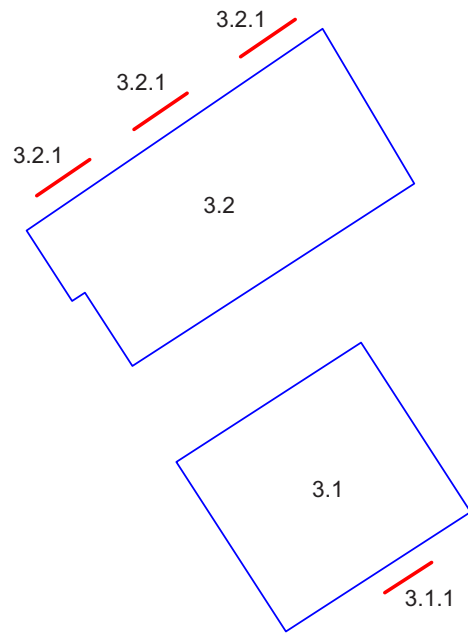
- ⑦ 115 Tottenham Court Road, third floor W1



First floor layout



Second floor layout



Third floor layout

Appendix 3: Average Daylight Factor

Floor Ref.	Room Ref.	Room Use	Window Ref.	Glass Transmittance	Glazed Area	Clear Sky Angle Proposed	Room Surface Area	Average Surface Reflectance	ADF Existing	ADF Proposed	Req'd Value	Pass/Fail
33 Grafton Way												
First	1.1	Kitchen	1.1.1	0.65	1.87	56.89	40.40	0.50	N/A	2.28	2.0	PASS
									N/A	2.28		
First	1.2	Front Bedsit	1.2.1	0.65	1.81	57.75	69.91	0.50	N/A	1.30	1.5	PASS
			1.2.2	0.65	1.81	58.05	69.91	0.50	N/A	1.30		
									N/A	2.60		
First	1.3	Rear Bedsit	1.3.1	0.65	5.22	44.38	60.12	0.50	N/A	3.34	1.5	PASS
									N/A	3.34		
Second	2.1	Living Room/ Kitchen	2.1.1	0.65	1.40	63.06	128.48	0.50	N/A	0.60	2.0	PASS
			2.1.2	0.65	1.36	64.17	128.48	0.50	N/A	0.59		
			2.1.3	0.65	1.36	64.65	128.48	0.50	N/A	0.59		
			2.1.4	0.65	3.96	62.14	128.48	0.50	N/A	1.66		
									N/A	3.44		
Second	3.1	Rear Bedroom	3.3.1	0.65	0.93	73.21	55.35	0.50	N/A	1.07	1.0	PASS
									N/A	1.07		
Second	3.2	Front Bedroom	3.2.1	0.65	1.10	68.91	72.19	0.50	N/A	0.91	1.0	PASS
			3.2.2	0.65	1.07	70.14	72.19	0.50	N/A	0.90		
			3.2.3	0.65	1.07	70.75	72.19	0.50	N/A	0.91		
									N/A	2.72		