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Daylight and Sunlight Study (Within Development)
23 Ravenshaw Street, London NW6 1NP

29 June 2020

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CONTENTS

1 EXECUTIVE SUMMARY

1.1 Overview

1.1.1 Right of Light Consulting has been commissioned by Chris Taylor to undertake a daylight and sunlight study in connection with the development at 23 Ravenshaw Street, London NW6 1NP. The aim of the study is to check whether or not the proposed development receives satisfactory levels of daylight and sunlight.

1.1.2 The study is based on the numerical tests laid down in the Building Research Establishment (BRE) guide 'Site Layout Planning for Daylight and Sunlight: a good practice guide, 2nd Edition' by P J Littlefair 2011.

1.1.3 Appendix 1 identifies the windows analysed in this study. The numerical test results (including all calculation workings) are provided in Appendix 2. No sky line contours are presented in Appendix 1.

1.1.4 Right of Light Consulting confirms that the proposed design satisfies all of the requirements set out in the BRE guide 'Site Layout Planning for Daylight and Sunlight'.

2 INFORMATION SOURCES

2.1 Documents Considered

2.1.1 This report is based on the following drawings:

Architects Drawing

Front Elevation: Left	Rev -
Front Elevation: Right	Rev -
Rear Elevation: Left	Rev -
Rear Elevation: Right	Rev -
Section AA	Rev -
Section BB1 & BB2	Rev -
Section CC & DD	Rev -
Section EE	Rev -
Section FF	Rev -
Section GG & HH	Rev -
Section II & JJ	Rev -
Site Plan	Rev -
Basement Plan	Rev -
Ground Floor Plan	Rev -
First Floor Plan	Rev -
Second Floor Plan	Rev -
Roof Plan	Rev -
Architects 3D Model	Rev -

Bluejet Mapping

OS Master map	Rev -

3 METHODOLOGY OF THE STUDY

3.1 Local Planning Policy

3.1.1 We understand that the Local Authority take the conventional approach of considering daylight and sunlight amenity with reference to the various numerical tests laid down in the Building Research Establishment (BRE) guide 'Site Layout Planning for Daylight and Sunlight: a guide to good practice, 2nd Edition' by P J Littlefair 2011. A new European standard BS EN 17037 'Daylight in Buildings' was published in May 2019. An update to the BRE guide to take into account the European standard is not anticipated until sometime in 2020. It is not yet clear, how and to what extent, the European recommendations will be adopted by the BRE and Local Authorities.

3.1.2 The standards set out in the BRE guide are intended to be used flexibly. The BRE guide states:

3.1.3 "The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and the guide 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, since natural lighting is only one of many factors in site layout design."

3.2 National Planning Policy Framework

3.2.1 The BRE numerical guidelines should be considered in the context of the National Planning Policy Framework (NPPF), which stipulates that local planning authorities should take a flexible approach to daylight and sunlight to ensure the efficient use of land. The NPPF states:

3.2.2 "Local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards)."

3.3 Interior Daylighting

3.3.1 The interior daylighting recommendations set out in BRE guide are based on British Standard BS 8206 Part 2 and the Chartered Institute of Building Services Engineers Applications Manual on window design. Collectively, the guides set out three main criteria for interior daylighting. These are summarised as follows:

Test 1 Average Daylight Factor *(df)*

3.3.2 The Average Daylight Factor can be calculated using the following formula:

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

Where

T is the diffuse visible transmittance of the glazing Awis the net glazed area of the window (m^2)
A is the total area of the room surfaces (m^2)
R is their average reflectance
Θ is the angle of visible sky in degrees

3.3.3 The Average Daylight factor test is applied to habitable rooms within domestic properties. A kitchen is generally deemed to be a habitable room if it is large enough to accommodate a dining area. If the kitchen is small or if the property has a separate dining area then the accepted practice is to treat the kitchen as a non habitable room.

3.3.4 For the purpose of this study we have assumed BRE internal reflectance values pertaining to medium wooden floors (Coefficient value of 0.4), light painted walls (0.85) on the ground floor and above, Dulux Ultra White painted walls in the basement (0.93) and matte white painted ceilings (0.85).

3.3.5 For the purpose of this study we have assumed the windows consist of modern double-glazed units with a frame to glazing ratio of 0.85. A maintenance factor has been applied to consider the effect of dirt and grime on the visibility of the window. On this basis, the transmittance value used within this study is 0.68. A lower transmittance value (0.46) has been applied to a portion of Windows 9 & 10 due to the impact of the glass walkways above these windows.

3.3.6 To achieve a predominately daylit space, the guide recommends an Average Daylight Factor of 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary lighting is provided. There are additional minimum recommendations for dwellings of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms.

3.3.7 The BRE guide does not give guidance on how to apply the ADF test to spaces which contain a mix of room uses e.g. open plan living, dining and kitchen areas. For this assessment we have set a target of 2% with the aim of reaching the predominately daylit benchmark.

3.3.8 A special procedure is required for floor to ceiling windows such as patio doors. If part of a window is below the height of the working plane (a horizontal plane 0.85m above the floor in housing), this portion should be treated as a separate window. The ADF for this window has an extra factor applied to it, to take account of the reduced effectiveness of low level glazing in lighting the room. A value equal to the floor reflectance may be taken for this factor. The ADF for the portion of the window above the working plane is calculated in the normal way without this additional factor, and the ADFs for the two portions are added together.

3.3.9 Where a window has a large obstruction in front of it, the angle of visible sky can be increased by around 6° assuming the obstruction is painted a light colour.

Test 2 Room Depth

3.3.10 If a daylit room is lit by windows in one wall only, the depth of the room L should not exceed the limiting value given by:

$$\frac{L}{W} + \frac{L}{H} \leq \frac{2}{1-R_b}$$

Where

W is the room width
H is the window-head height above floor level
R_b is the average reflectance of the surfaces in the rear half of the room

Test 3 Position of the no sky line

3.3.11 If a significant area of the working plane lies beyond the no sky line (i.e. it receives no direct skylight), then the distribution of daylight in the room will look poor and supplementary electric lighting will be required.

3.3.12 The no sky line assessment is not applicable where a room derives its daylight solely from a light well or atrium. In these situations the room relies on borrowed light instead of direct skylight.

3.4 Sunlight to Windows

3.4.1 The BRE guide recommends that where possible each dwelling should have at least one main living room window that faces within 90 degrees of due south. However, the guide acknowledges that this is not always possible when it comes to flats.

3.4.2 The BRE sunlight tests should be applied to all main living rooms and conservatories which have a window which faces within 90 degrees of due south. The guide states that sunlight is viewed as less important in kitchens and bedrooms. In non-domestic buildings, any spaces which are deemed to have a specific requirement for sunlight should be checked.

3.4.3 The BRE guide recommends that main living room windows should receive 25% of the total annual probable sunlight hours, including 5% of the annual probable sunlight hours during the winter months between 21st September and 21st March.

4 RESULTS OF THE STUDY

4.1 Window Reference Points and No Sky Line Contours

4.1.1 Refer to Appendix 1 for a drawing which identifies the positions of the windows analysed in this study. The no skyline contours for the habitable rooms are also presented in Appendix 1.

4.2 Numerical Results

4.2.1 The numerical test results including all calculation workings are provided in Appendix 2.

4.3 Interior Daylighting

4.3.1 All rooms meet or surpass the BRE Average Daylight Factor targets.

4.3.2 All rooms pass the room depth test, where the test is applicable.

4.3.3 The BRE guide does not give fixed numerical pass/fail criteria for the No Sky Line test when applied to new dwellings (guidance is given for when this test is applied to existing neighbouring buildings). However, for completeness, we have illustrated the no sky line contours in Appendix 1.

4.4 Sunlight to Windows

4.4.1 The BRE guide explains that for apartments it may not be possible to have every living room facing with 90 degrees of due south. The guide goes on to explain that the number of north facing living rooms should be minimised. Figure 26 on page 15 of the guide illustrates an example of good layout design where only 1 out of 5 apartments (20%) have only north facing windows. In the case of the proposed units at 23 Ravenshaw Street, none of the units have only north facing living room windows. The proposed development therefore satisfies the BRE direct sunlight to windows requirements.

4.5 Conclusion

4.5.1 Right of Light Consulting confirms that the proposed design satisfies all of the requirements set out in the BRE guide ‘Site Layout Planning for Daylight and Sunlight’.

5 CLARIFICATIONS

5.1 General

5.1.1 The report provided is solely for the use of the client and no liability to anyone else is accepted.

5.1.2 The study is limited to assessing daylight, sunlight of the proposed development as set out in section 2.1, 3.1 and 3.3 of the BRE Guide.

5.1.3 The study has been undertaken without access to the proposed development site or neighbouring properties. The study is based on the information listed in section 2 of this report.

5.1.4 This study does not calculate the effects of trees and hedges on daylight, sunlight and overshadowing to gardens. The BRE guide states that trees should sometimes be taken into account, e.g. where there is concern that future occupants of the dwelling may want the trees to be cutdown if they block too much skylight or sunlight. We are not aware of any such circumstances, in this instance.

5.1.5 We have undertaken the survey following the guidelines of the RICS publication “Surveying Safely”. Where limited access is available, assumptions will have been made.

5.1.6 This report is based upon and subject to the scope of work set out in Right of Light Consulting’s quotation and standard terms and conditions.

APPENDICES

APPENDIX 1

WINDOW KEY & NO SKY LINE CONTOURS

Proposed Basement Floor

Window Key and No Sky Line Contours

Key:

- Window reference
- Area receives no direct sky light (applied to habitable rooms)
- Area does receive direct sky light.
- Light aperture.

Project Name: 23 Ravenshaw Street, London NW6 1NP

Drawing Title: Window Key and No Sky Line Contours

Scale: Do not scale

Drawing No: 1 of 4 | Rev. -

Rev	Date	Details of revision

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Proposed Ground Floor

Window Key and No Sky Line Contours

Key:

- Window reference
- Area receives no direct sky light (applied to habitable rooms)
- Area does receive direct sky light.
- Light aperture.

Project Name: 23 Ravenshaw Street, London NW6 1NP

Drawing Title: Window Key and No Sky Line Contours

Scale: Do not scale

Drawing No: 2 of 4 | Rev. -

Rev	Date	Details of revision

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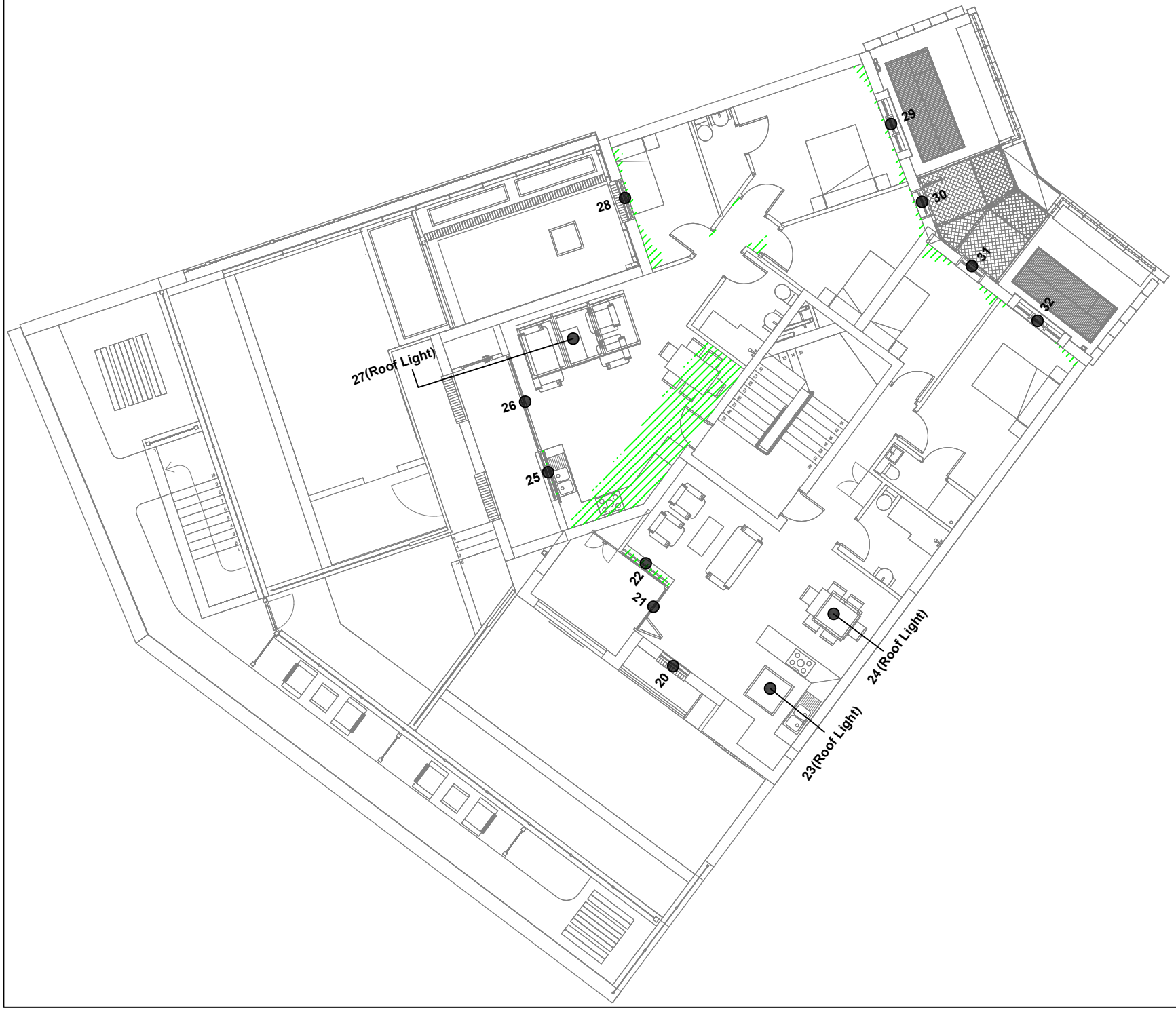
Proposed First Floor

Window Key and No Sky Line Contours



Key:

- Window reference
- Area receives no direct sky light (applied to habitable rooms)
- Area does receive direct sky light.
- Light aperture.

Project Name: 23 Ravenshaw Street, London NW6 1NP

Drawing Title: Window Key and No Sky Line Contours

Scale: Do not scale

Drawing No: 3 of 4 | Rev. -

Rev	Date	Details of revision

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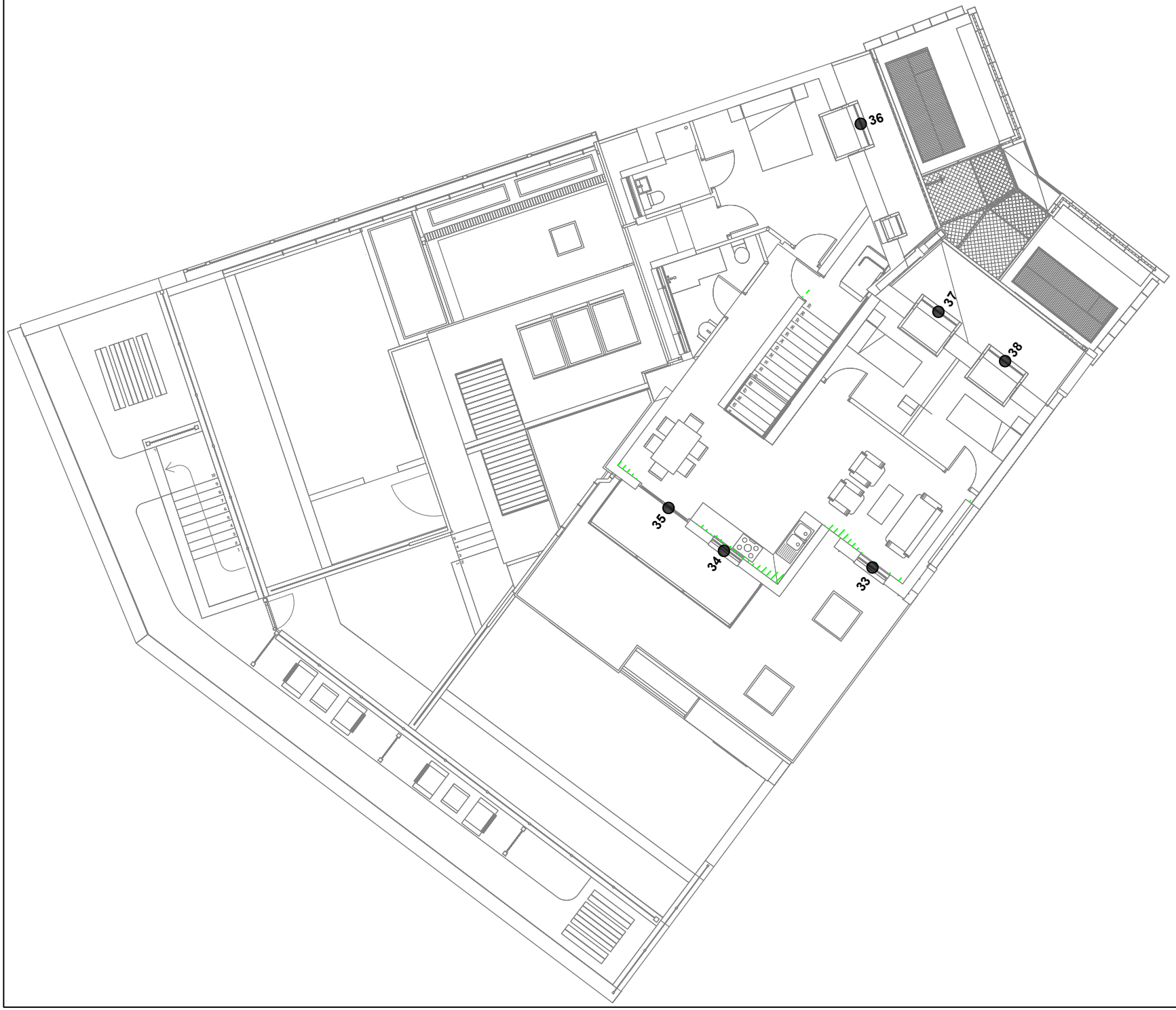
Proposed Second Floor

Window Key and No Sky Line Contours



Key:

- Window reference
- Area receives no direct sky light (applied to habitable rooms)
- Area does receive direct sky light.
- Light aperture.

Project Name: 23 Ravenshaw Street, London NW6 1NP

Drawing Title: Window Key and No Sky Line Contours

Scale: Do not scale

Drawing No: 4 of 4 | Rev. -

Rev	Date	Details of revision

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APPENDIX 2

DAYLIGHT AND SUNLIGHT CALCULATIONS

Appendix 2 - Average Daylight Factor (ADF)

23 Ravenshaw Street, London NW6 1NP

Reference	Target ADF based on room use		Average Daylight Factor Coefficients					Actual ADF
	Primary room use	ADF	T	Aw	A	R	Theta	ADF
23 Ravenshaw Street								
Basement Floor								
Window 1 (lower)			0.68	3.66	205.99	0.75	48.3	0.5%
Window 1 (upper)			0.68	6.0	205.99	0.75	56.7	2.6%
Total ADF for room	Living/Dining/Kitchen	2.0%						**3.1%**
Window 2 (lower)			0.68	0.07	75.48	0.8	50.2	0.0%
Window 2 (upper)			0.68	1.77	75.48	0.8	57.9	2.5%
Total ADF for room	Bedroom	1.0%						**2.5%**
Window 3	Bedroom	1.0%	0.68	1.83	65.93	0.8	64.7	**3.4%**
Window 4 (lower)			0.68	2.41	175.94	0.72	49.6	0.4%
Window 4 (upper)			0.68	6.42	175.94	0.72	60.9	3.2%
Window 5			0.68	3.74	175.94	0.72	100.5	3.1%
Window 6			0.68	0.98	175.94	0.72	64.9	0.5%
Window 7			0.68	0.98	175.94	0.72	57.4	0.5%
Total ADF for room	Living/Dining/Kitchen	2.0%						**7.7%**
Window 8 (lower)			0.68	1.9	72.39	0.75	25.0	0.4%
Window 8 (upper)			0.68	3.91	72.39	0.75	29.0	2.4%
Total ADF for room	Bedroom	1.0%						**2.8%**
Window 9 (lower)			0.68	1.21	65.53	0.78	12.9	0.2%
Window 9 (upper)			0.68	2.06	65.53	0.78	8.3	0.5%
Window 9 (lower) - Glass Walkway			0.46	1.21	65.53	0.78	27.8	0.2%
Window 9 (upper) - Glass Walkway			0.46	2.06	65.53	0.78	43.2	1.6%
Total ADF for room	Bedroom	1.0%						**2.5%**
Window 10 (lower)			0.68	1.37	69.06	0.78	12.4	0.2%
Window 10 (upper)			0.68	2.34	69.06	0.78	7.9	0.5%
Window 10 (lower) - Glass Walkway			0.46	1.37	69.06	0.78	28.1	0.3%
Window 10 (upper) - Glass Walkway			0.46	2.34	69.06	0.78	42.9	1.7%
Total ADF for room	Bedroom	1.0%						**2.7%**
Window 11 (lower)			0.68	1.78	68.76	0.76	24.2	0.4%
Window 11 (upper)			0.68	3.66	68.76	0.76	28.0	2.4%
Total ADF for room	Bedroom	1.0%						**2.8%**

Appendix 2 - Average Daylight Factor (ADF)
23 Ravenshaw Street, London NW6 1NP

Reference	Target ADF based on room use		Average Daylight Factor Coefficients					Actual ADF
	Primary room use	ADF	T	Aw	A	R	Theta	ADF
Ground Floor								
Window 12 (lower)			0.68	0.3	148.47	0.68	69.4	0.1%
Window 12 (upper)			0.68	1.29	148.47	0.68	79.8	0.9%
Window 13 (lower)			0.68	1.71	148.47	0.68	35.4	0.2%
Window 13 (upper)			0.68	3.31	148.47	0.68	29.3	0.8%
Total ADF for room	Living/Dining/Kitchen	2.0%						**2.0%**
Window 14 (lower)			0.68	0.3	56.98	0.71	82.6	0.2%
Window 14 (upper)			0.68	1.29	56.98	0.71	88.4	2.8%
Total ADF for room	Bedroom	1.0%						**3.0%**
Window 15 (lower)			0.68	3.14	161.13	0.68	62.3	0.6%
Window 15 (upper)			0.68	5.28	161.13	0.68	87.7	3.6%
Total ADF for room	Living/Dining/Kitchen	2.0%						**4.2%**
Window 16 (lower)			0.68	0.08	57.0	0.71	74.4	0.1%
Window 16 (upper)			0.68	1.14	57.0	0.71	80.6	2.2%
Window 17			0.68	0.54	57.0	0.71	97.3	1.3%
Total ADF for room	Bedroom	1.0%						**3.6%**
Window 18 (lower)			0.68	0.11	68.65	0.71	74.4	0.1%
Window 18 (upper)			0.68	2.19	68.65	0.71	76.5	3.3%
Total ADF for room	Bedroom	1.0%						**3.4%**
Window 19 (lower)			0.68	0.65	55.79	0.7	73.3	0.5%
Window 19 (upper)			0.68	1.59	55.79	0.7	75.7	2.9%
Total ADF for room	Bedroom	1.0%						**3.4%**
First Floor								
Window 20 (lower)			0.68	0.16	168.64	0.68	77.6	0.0%
Window 20 (upper)			0.68	1.07	168.64	0.68	80.9	0.7%
Window 21 (lower)			0.68	1.06	168.64	0.68	18.4	0.1%
Window 21 (upper)			0.68	2.05	168.64	0.68	13.3	0.2%
Window 22			0.68	2.12	168.64	0.68	16.7	0.3%
Window 23			0.68	0.9	168.64	0.68	141.9	1.0%

Appendix 2 - Average Daylight Factor (ADF)
23 Ravenshaw Street, London NW6 1NP

Reference	Target ADF based on room use		Average Daylight Factor Coefficients					Actual ADF
	Primary room use	ADF	T	Aw	A	R	Theta	ADF
Window 24			0.68	0.9	168.64	0.68	111.5	0.8%
Total ADF for room	Living/Dining/Kitchen	2.0%						**3.1%**
Window 25			0.68	1.23	139.59	0.67	51.1	0.5%
Window 26 (lower)			0.68	2.06	139.59	0.67	38.4	0.3%
Window 26 (upper)			0.68	2.47	139.59	0.67	50.6	1.1%
Window 27			0.68	4.25	139.59	0.67	106.2	3.9%
Total ADF for room	Living/Dining/Kitchen	2.0%						**5.8%**
Window 28	Bedroom	1.0%	0.68	1.45	43.72	0.71	81.8	**3.8%**
Window 29	Bedroom	1.0%	0.68	1.98	67.14	0.7	82.5	**3.3%**
Window 30	Bedroom	1.0%	0.68	0.9	51.53	0.72	81.4	**2.0%**
Window 31 (lower)			0.68	0.11	48.01	0.73	78.5	0.1%
Window 31 (upper)			0.68	0.79	48.01	0.73	80.0	1.9%
Total ADF for room	Bedroom	1.0%						**2.0%**
Window 32 (lower)			0.68	0.4	65.6	0.71	80.2	0.3%
Window 32 (upper)			0.68	1.65	65.6	0.71	81.7	2.8%
Total ADF for room	Bedroom	1.0%						**3.1%**
Second Floor								
Window 33			0.68	1.01	169.52	0.7	80.2	0.6%
Window 34			0.68	1.01	169.52	0.7	87.3	0.7%
Window 35 (lower)			0.68	1.28	169.52	0.7	59.8	0.2%
Window 35 (upper)			0.68	1.92	169.52	0.7	87.0	1.3%
Total ADF for room	Living/Dining/Kitchen	2.0%						**2.8%**
Window 36	Bedroom	1.0%	0.68	1.78	85.53	0.72	115.7	**3.4%**
Window 37	Bedroom	1.0%	0.68	1.75	51.8	0.72	115.1	**5.5%**
Window 38	Bedroom	1.0%	0.68	1.78	51.22	0.72	110.7	**5.5%**

Appendix 2 - Room Depth Calculation

23 Ravenshaw Street, London NW6 1NP

Room	Room Depth Coefficients				Room Depth Calculation		
	L	W	H	Rb	L/W + L/H	<=	2/1-Rb
23 Ravenshaw Street							
Basement Floor							
Window 1	8.7	8.1	2.2	0.69	5.03	<=	6.42
Window 2	3.6	5.1	2.6	0.72	2.09	<=	7.1
Window 3	4.6	2.4	2.6	0.72	3.69	<=	7.19
Window 4	8.9	6.8	3.1	0.66	4.18	<=	5.96
Window 8	4.4	3.1	2.6	0.68	3.11	<=	6.26
Window 9	4.5	2.8	2.3	0.7	3.56	<=	6.77
Window 10	4.7	2.6	2.3	0.7	3.85	<=	6.74
Window 11	4.7	2.6	2.6	0.69	3.62	<=	6.37
Ground Floor							
Window 12	10.2	5.9	2.1	0.68	6.59	<=	6.34
Window 13	7.8	5.9	2.5	0.68	4.44	<=	6.34
Window 14	3.8	3.0	2.1	0.71	3.08	<=	6.9
Window 15	7.9	6.2	2.3	0.68	4.71	<=	6.17
Window 16	4.5	2.5	2.0	0.71	4.05	<=	6.9
Window 18	5.1	3.1	2.5	0.71	3.69	<=	6.79
Window 19	4.3	2.6	2.0	0.7	3.8	<=	6.75
First Floor							
Window 20	9.9	7.2	2.1	0.68	6.09	<=	6.33
Window 21	5.5	9.9	2.5	0.68	2.76	<=	6.33
Window 22	8.3	7.2	2.5	0.68	4.47	<=	6.33
Window 25	8.1	6.1	1.9	0.67	5.59	<=	5.98
Window 26	8.1	6.1	1.9	0.67	5.59	<=	5.98
Window 28	2.3	3.6	2.5	0.71	1.56	<=	7.0
Window 29	4.5	3.6	2.5	0.7	3.05	<=	6.77
Window 30	4.6	3.3	2.5	0.72	3.23	<=	7.17
Window 31	3.7	2.5	2.1	0.73	3.24	<=	7.29
Window 32	4.9	2.8	2.1	0.71	4.08	<=	6.79
Second Floor							
Window 33	5.6	8.5	2.1	0.7	3.33	<=	6.64
Window 34	7.8	8.5	2.1	0.7	4.63	<=	6.64
Window 35	7.8	8.5	2.1	0.7	4.63	<=	6.64

Appendix 2 - Sunlight to Windows

23 Ravenshaw Street, London NW6 1NP

Reference	Use Class	Annual Probable Sunlight Hours	
		Total	Winter
23 Ravenshaw Street			
Basement Floor			
Window 1	Living/Dining/Kitchen	35%	2%
Window 4	Living/Dining/Kitchen	35%	7%
Window 5	Living/Dining/Kitchen	33%	3%
Window 6	Living/Dining/Kitchen	7%	0%
Window 7	Living/Dining/Kitchen	5%	0%
Ground Floor			
Window 12	Living/Dining/Kitchen	53%	17%
Window 13	Living/Dining/Kitchen	8%	8%
Window 15	Living/Dining/Kitchen	54%	19%
First Floor			
Window 20	Living/Dining/Kitchen	50%	21%
Window 21	Living/Dining/Kitchen	3%	3%
Window 22	Living/Dining/Kitchen	2%	2%
Window 23	Living/Dining/Kitchen	33%	1%
Window 24	Living/Dining/Kitchen	33%	1%
Window 25	Living/Dining/Kitchen	18%	2%
Window 26	Living/Dining/Kitchen	19%	6%
Window 27	Living/Dining/Kitchen	47%	6%
Second Floor			
Window 33	Living/Dining/Kitchen	49%	21%
Window 34	Living/Dining/Kitchen	59%	23%
Window 35	Living/Dining/Kitchen	64%	25%