

Daylight and Sunlight Study (Within Development) 24 to 28 Warner Street, London EC1R 5EX

7th April 2011



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1 EXECUTIVE SUMMARY

1.1 Overview

- 1.1.1 Building Surveying Solutions has been commissioned to undertake a daylight and sunlight study in connection with the development at 24 to 28 Warner Street, London EC1R 5EX. The aim of the study is to check whether or not the proposed habitable rooms receive 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' by P J Littlefair 1991.
- 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 3.
- 1.1.4 Building Surveying Solutions 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:

dlg Architects

001	Site Plan & Site Location Plan Existing	Rev –
002	Ground Floor Plan Existing	Rev –
003	First Floor Plan Existing	Rev –
004	Roof Plan Existing	Rev –
005	Elevation 1, 2 & 3 Existing	Rev –
006	Section 4-4, 5-5, 6-6 & 7-7 Existing	Rev –
010	Site Plan Proposed	Rev –
011	Basement Plan Proposed	Rev –
012	Ground Floor Plan Proposed	Rev –
013	First & Second Floor Plan Proposed	Rev –
014	Third Floor Plan Proposed	Rev –
015	Fourth Floor Plan Proposed	Rev –
016	Roof Plan Proposed	Rev –
020	Warner Street Elevation Proposed	Rev –
030	Elevation A & B Proposed	Rev –
031	Elevation C & D Proposed	Rev –
032	Section E-E & F-F Proposed	Rev –
033	Section G-G & H-H Proposed	Rev –
034	Section J-J & K-K Proposed	Rev –
040	3D Illustrative Model Views Existing & Proposed	Rev –

3 METHODOLOGY OF THE STUDY

3.1 BRE Guide: Site Layout Planning for Daylight and Sunlight

- 3.1.1 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' by P J Littlefair 1991.
- 3.1.2 The standards set out in the BRE guide are intended to be used flexibly. In instances where there is a special requirement for daylight or sunlight, higher levels may be deemed necessary. In other situations, such as with urban developments, lower daylight and sunlight levels may be unavoidable. The following statement is quoted directly from the BRE guide:
- 3.1.3 "The guide is intended for building designers and their clients, consultants and planning officials. The advice given is not mandatory and this document should not be considered as an instrument of planning policy. Its aim is to help rather than constrain the developer. Although it gives numerical guidelines, these should be interpreted flexibly because natural lighting is only one of the many factors in site layout design."

3.2 Interior Daylighting

3.2.1 The interior daylighting recommendations set out in BRE 209 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:

3.2.2 Test 1 Average Daylight Factor (df)

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

Aw is the net glazed area of the window (m²)

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

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.

For the purpose of this study we have assumed BRE internal reflectance values pertaining to medium wooden floors, light painted walls and matte white painted ceilings.

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.

3.2.3 Test 2 Room Depth

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

3.2.4 Test 3 Position of the no sky line

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.

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.

3.3 Sunlight to Windows

- 3.3.1 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.
- 3.3.2 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.
- 3.3.3 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

4.1.1 Refer to Appendix 1 for a drawing which identifies the positions of the windows analysed in this study.

4.2 Numerical Results and No Sky Line Contours

- 4.2.1 The numerical test results including all calculation workings are provided in Appendix
 - 2. No sky line contours for the habitable rooms are presented in Appendix 3.

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.
- 4.3.3 The BRE guide does not give 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 3.

4.4 Sunlight to Windows

4.4.1 Living rooms which face within 90 degrees of due south have been tested for direct sunlight. The results are presented in Appendix 2. Not all windows receive ideal levels of direct sunlight. However, the BRE guide acknowledges that it is not always possible for every dwelling to be well situated to receive direct sunlight.

4.5 Conclusion

4.5.1 Building Surveying Solutions confirms that the proposed design satisfies all of the requirements set out in the BRE guide 'Site Layout Planning for Daylight and Sunlight'.

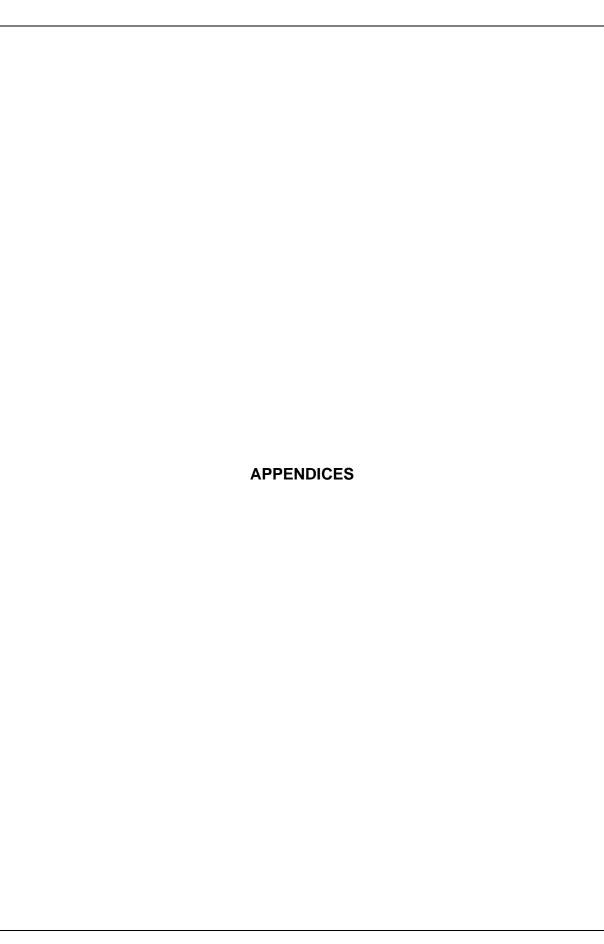
5 CLARIFICATIONS

5.1 General

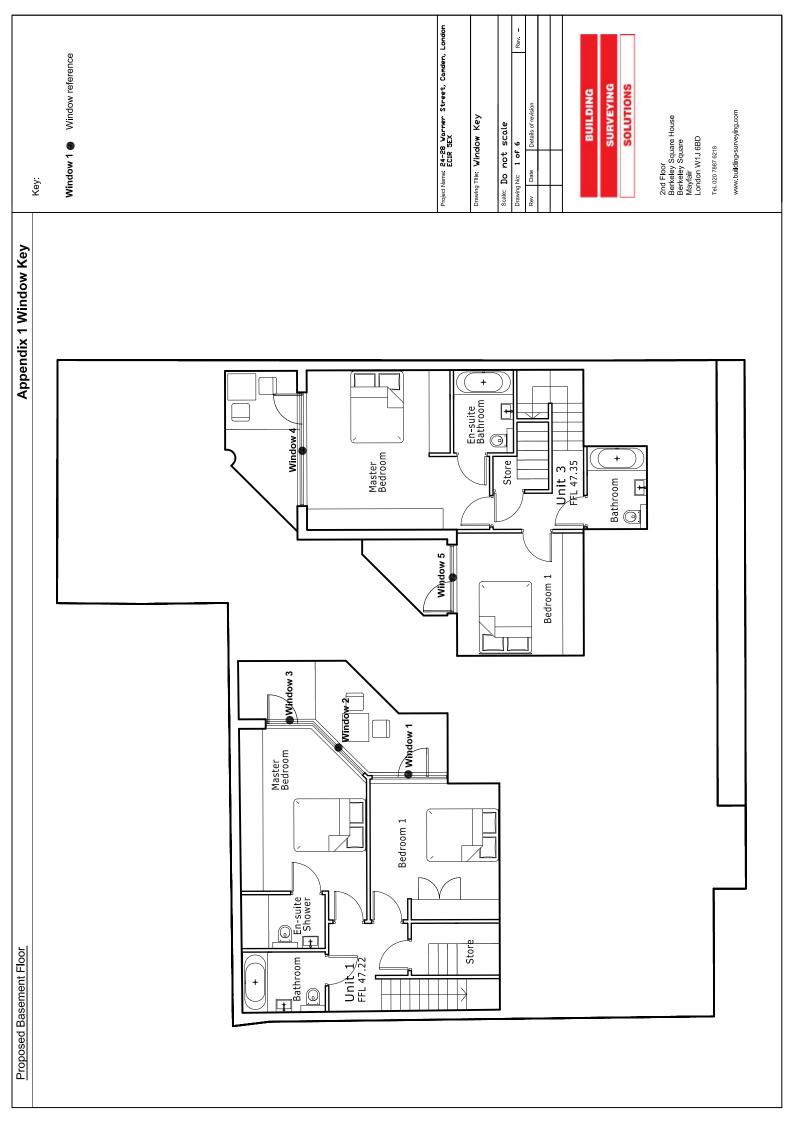
- 5.1.1 The report provided is solely for the use of the client and no liability to anyone else is accepted.
- 5.1.2 We have undertaken the survey following the guidelines of the RICS publication "Surveying Safely".
- 5.1.3 Where limited access is available, reasonable assumptions will have been made.
- 5.1.4 Building Surveying Solutions have endeavoured to include in the report those matters, which they have knowledge of or of which they have been made aware, that might adversely affect the validity of the opinion given.
- 5.1.5 Building Surveying Solutions will notify those instructing them immediately and confirm in writing if for any reason the report requires any correction or qualification.
- 5.1.6 Building Surveying Solutions confirm that they have used their best endeavours to ensure that the facts stated in this report are correct and that the opinions expressed represent a true and complete professional opinion.

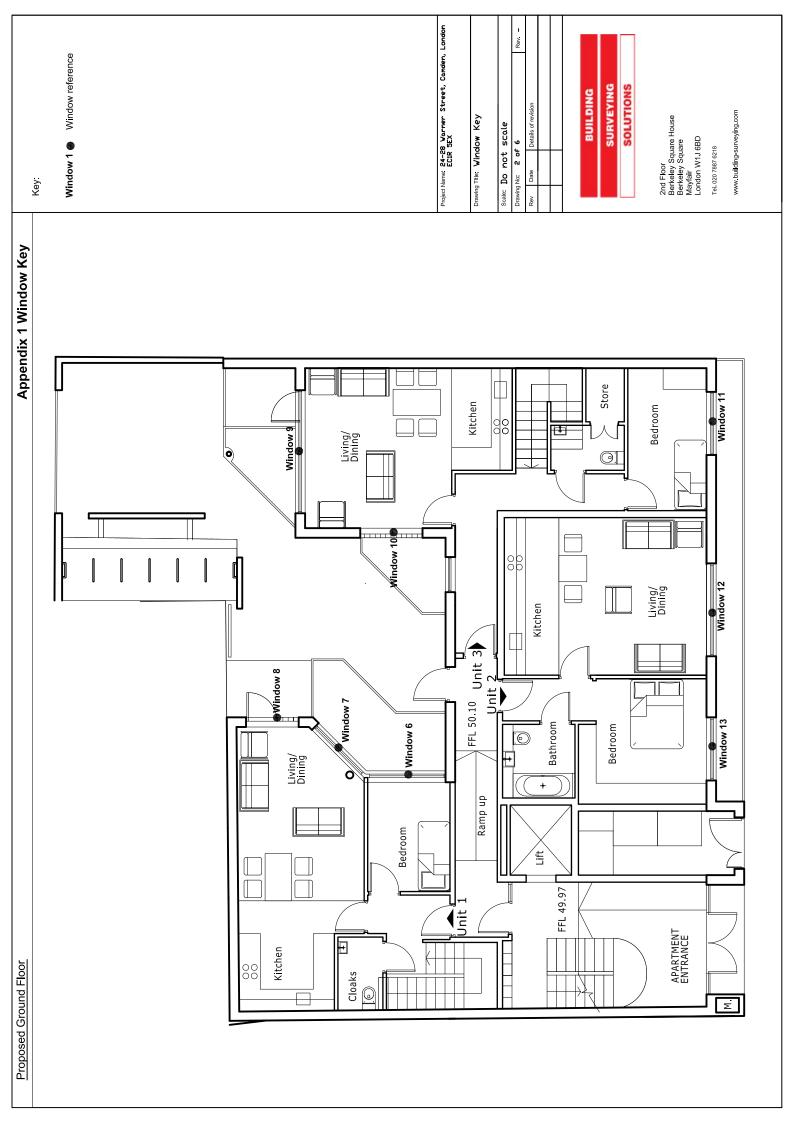
5.2 Project Specific

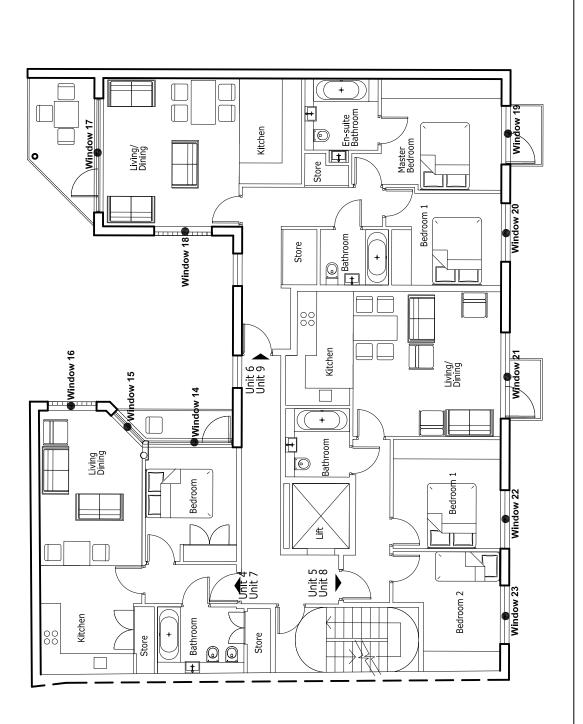
5.2.1 None



APPENDIX 1	
WINDOW KEY	







Window 1 Window reference

Project Name: 24-28 Varner Street, Canden, London

ELIR 5EX

Drawing Title: Window Key

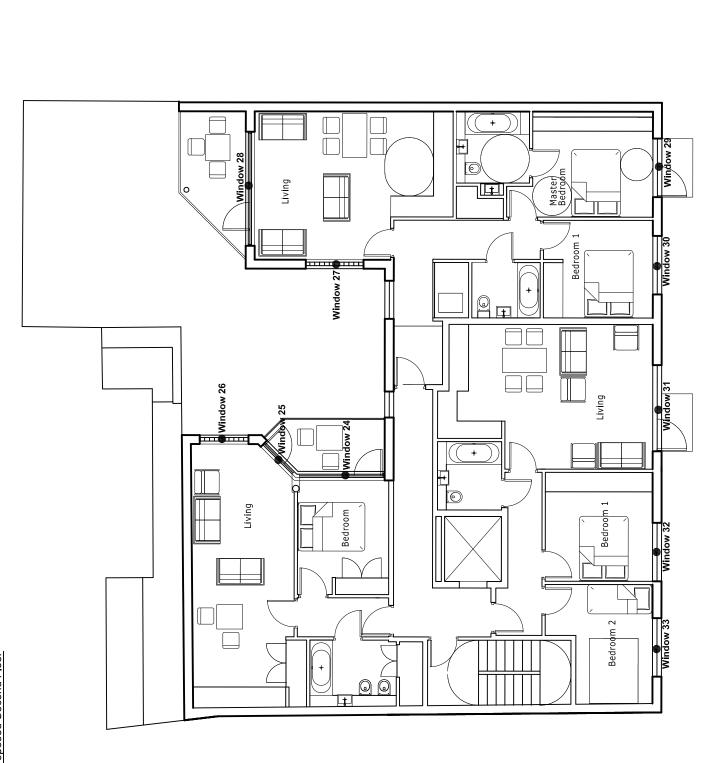
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Window 1 Window reference

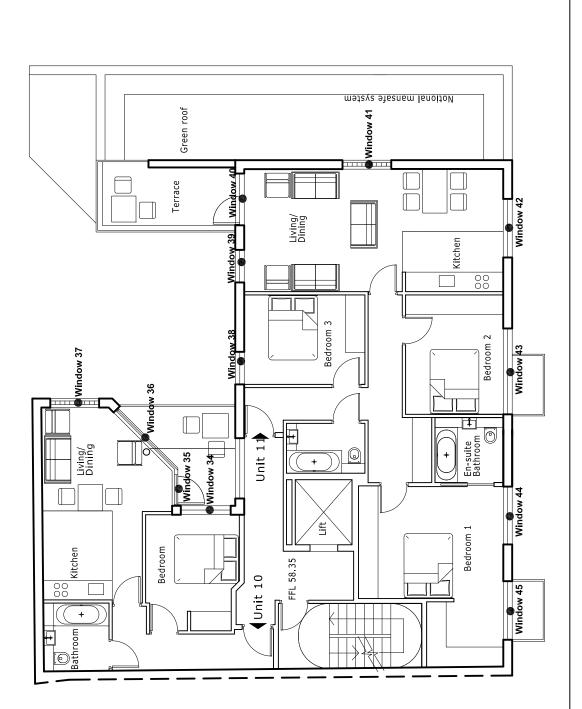
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Window 1 Window reference

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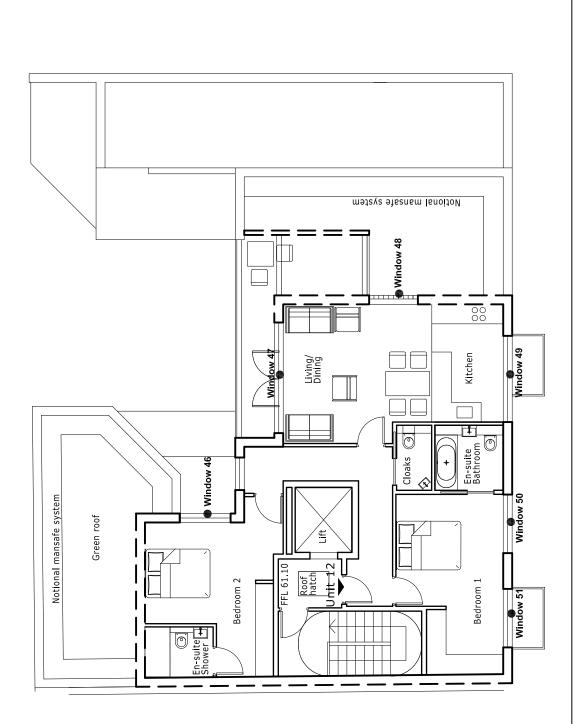
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Project Name: 24-28 Varner Street, Canden, London ECIR 5EX Rev Window 1 ● Window reference SURVEYING BUILDING Details of revisior Drawing Title: Window Key Scale: Do not scale Drawing No. 6 of 6 Date Key

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	APPENDIX 2		
	DAYLIGHT AND SUNLIGHT CALCULATIONS		
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Appendix 2 - Average Daylight Factor (ADF) 24-28 Warner Street, Camden, London EC1R 5EX

Reference	Target ADF based on room use	room use		Average Da	Average Daylight Factor Coefficients	or Coefficie	nts		Actual ADF	JF.
	Primary room use	ADF	_	Aw	А	Я	Theta	ADF)F	Result
Proposed Basement Floor										
Window 1	Bedroom	1.0%	0.65	4.04	61.97	0.69	18.1		1.5%	Pass
Window 2			0.65	3.58	65.05	0.7	13.6		%6:0	
Window 3			0.39	2.87	65.05	0.7	19.0		%9:0	
Total ADF for room	Bedroom	1.0%							1.5%	Pass
Window 4	Bedroom	1.0%	0.52	6.72	91.71	0.68	29.5		2.1%	Pass
Window 5	Bedroom	1.0%	0.65	3.77	52.53	0.69	23.3		2.1%	Pass
Proposed Ground Floor										
Window 6	Bedroom	1.0%	0.65	3.99	40.85	0.68	8.8		1.0%	Pass
Window 7			0.65	3.45	83.6	0.69	15.3		0.8%	
Window 8			9.0	3.3	83.6	0.69	25.2		1.1%	
Total ADF for room	Living Room	1.5%							1.9%	Pass
Window 9			0.65	2.98	80.06	0.69	20.2		%6:0	
Window 10			9.0	5.9	80.06	0.67	37.4		3.0%	
Total ADF for room	Living Room	1.5%							3.9%	Pass
Window 11	Bedroom	1.0%	0.65	2.51	48.46	0.7	31.7		2.1%	Pass
Window 12	Living Room	1.5%	0.65	3.69	79.55	0.69	35.5		2.0%	Pass
Window 13	Bedroom	1.0%	0.65	2.51	59.49	0.7	32.7		1.7%	Pass
Proposed First Floor										
Window 14	Bedroom	1.0%	0.65	4.39	49.97	0.68	20.6		2.2%	Pass
Window 15			0.65	2.39	65.24	0.7	22.3		1.0%	
Window 16			9.0	2.82	65.24	0.7	31.1		1.6%	
Total ADF for room	Living Room	1.5%							7.6%	Pass
Window 17			0.65	2.98	80.17	0.69	27.4		1.3%	
Window 18			9.0	6.59	80.17	0.67	43.1		3.8%	
Total ADF for room	Living Room	1.5%							5.1%	Pass
Window 19	Bedroom	1.0%	0.65	3.23	62.62	0.7	57.5		3.8%	Pass
Window 20	Bedroom	1.0%	0.65	3.23	53.49	0.7	60.2		4.6%	Pass
		_							_	

Appendix 2 - Average Daylight Factor (ADF) 24-28 Warner Street, Camden, London EC1R 5EX

Reference	Target ADF based on room use	room use		Average Da	Average Daylight Factor Coefficients	or Coefficie	nts		Actual ADF	JF
	Primary room use	ADF	⊢	Aw	Α	æ	Theta	A	ADF	Result
Window	and Desired	7 60/	9	A 7E	73 50	890			4 20/ Bacc	000
		??	9	?	5	0.0	<u>-</u>		, 1	600
Window 22	Bedroom	1.0%	0.65	3.23	54.0	0.69	58.9		4.4%	Pass
Window 23	Bedroom	1.0%	0.65	3.23	53.67	0.7	57.8		4.4% Pass	Pass
Proposed second floor										
Window 24	Bedroom	1.0%	0.65	4.39	49.97	0.68	20.3		2.2%	Pass
Window 25			0.65	2.39	65.22	0.7	26.6		1.2%	
Window 26			9.0	2.82	65.22	0.7	38.7		2.0%	
Total ADF for room	Living Room	1.5%							3.2%	Pass
Window 27			9.0	2.98	80.1	0.69	39.2		1.7%	
Window 28			0.65	6.59	80.1	0.67	51.0		4.9%	
Total ADF for room	Living Room	1.5%							%9.9	Pass
Window 29	Bedroom	1.0%	0.65	3.23	62.62	0.7	62.7		4.1%	Pass
Window 30	Bedroom	1.0%	0.65	3.23	53.49	0.7	65.2		2.0%	Pass
Window 31	Living Room	1.5%	0.65	4.75	83.58	0.68	66.7		4.6%	Pass
Window 32	Bedroom	1.0%	0.65	3.23	54.0	0.69	65.4		4.9%	Pass
Window 33	Bedroom	1.0%	0.65	3.23	53.67	0.7	64.7		4.9% Pass	Pass
Proposed Third Floor										
Window 34	Bedroom	1.0%	0.65	2.7	53.02	0.71	34.8		2.3%	Pass
Window 35			0.65	2.07	72.24	0.72	18.4		0.7%	
Window 36			0.65	5.17	72.24	0.69	40.0		3.6%	
Window 37	acivi I	1 5%	9.0	2.81	72.24	0.71	49.8		2.4%	0000
lotal ADF for room	LIVING ROOM	0.0%							%/.0	rass
Window 38	Bedroom	1.0%	0.65	1.96	51.42	0.71	59.1		2.9%	Pass
Window 39			0.65	1.96	104.87	0.71	63.3		1.5%	
Window 40			0.65	2.67	104.87	0.7	60.4		2.0%	
Window 41			9.0	2.87	104.87	0.7	35.5		1.2%	
Window 42			0.65	3.23	104.87	0.7	70.8		2.8%	
Total ADF for room	Living Room	1.5%							7.5% Pass	Pass

Appendix 2 - Average Daylight Factor (ADF) 24-28 Warner Street, Camden, London EC1R 5EX

Reference	Target ADF bas	Target ADF based on room use
	Primary room use	se ADF
Window 42	Kitchen	2.0%
Window 43	Bedroom	1.0%
Window 44		
Window 45		
Total ADF for room	Bedroom	1.0%
Proposed Fourth Floor		
Window 46	Bedroom	1.0%
Window 47		
Window 48		
Window 49		
Total ADF for room	Living Room	1.5%
Window 49	Kitchen	2.0%
Window 50		
Window 51		
Total ADF for room	Bedroom	1.0%

\DF	Result	Pass	Pass			Pass	Pass				Pass	Pass			Pass
Actual ADF	ADF	7.7%	7.6%	3.2%	3.2%	6.4%	2.4%	8.9%	2.4%	2.7%	14.9%	%9.6	4.9%	4.9%	%8%
ıts	Theta	70.8	72.5	72.5	72.4		53.0	7.1.7	9.99	78.7		78.7	79.6	80.2	
Average Daylight Factor Coefficients	R	0.67	0.68	0.7	0.7		0.71	0.67	0.7	0.68		0.65	0.7	0.7	
ylight Facto	Α	35.08	54.08	92.51	92.51		76.45	79.96	79.96	79.96		43.78	67.34	67.34	
Average Da	Aw	3.23	4.73	3.19	3.23		2.63	6.43	2.87	4.75		4.75	3.23	3.23	
	⊥	0.65	0.65	0.65	0.65		0.65	0.65	9.0	0.65		0.65	0.65	0.65	

1.0%

1.5%

1.0%

2.0% 1.0% 1.0%

Appendix 2 - Room Depth Calculation 24-28 Warner Street, Camden, London EC1R 5EX

Room	Rc	Room Depth Coefficients	Coefficient	s	Room D	Room Depth Calculation	culation	Result
	٦	W	I	Rb	LW + UH	=>	2/1-Rb	
Proposed Basement Floor								
Window 1	3.9	3.7	2.4	0.73	2.68	II V	7.35	Pass
Window 2	4.2	4.2	2.3	0.73	2.83	II V	7.35	Pass
Window 3	5.0	3.0	2.4	0.73	3.75	II V	7.35	Pass
Window 4	5.2	4.6	2.4	0.72	3.3	II V	7.14	Pass
Window 5	3.0	3.5	2.4	0.73	2.11	II V	7.39	Pass
Proposed Ground Floor								
Window 6	3.1	2.3	2.8	0.74	2.45	II V	7.61	Pass
Window 7	5.1	5.1	2.8	0.72	2.82	II V	7.04	Pass
Window 8	5.9	3.6	2.8	0.72	3.75	II V	7.04	Pass
Window 9	4.6	4.2	2.5	0.72	2.94	II V	7.06	Pass
Window 10	4.2	4.6	2.5	0.72	2.59	II V	7.06	Pass
Window 11	2.2	4.1	2.5	0.73	1.42	II V	7.53	Pass
Window 12	4.2	4.5	2.5	0.72	2.61	II V	7.06	Pass
Window 13	3.6	3.6	2.5	0.73	2.44	II V	7.33	Pass
Proposed First Floor								
Window 14	3.5	2.8	2.4	0.73	2.71	II V	7.44	Pass
Window 15	4.4	4.5	2.4	0.72	2.81	II V	7.21	Pass
Window 16	4.8	3.2	2.4	0.72	3.5	II V	7.21	Pass
Window 17	4.6	4.2	2.7	0.72	2.8	II V	7.06	Pass
Window 18	4.2	4.6	2.7	0.72	2.47	II V	7.06	Pass
Window 19	4.5	3.2	2.5	0.73	3.21	II V	7.37	Pass
Window 20	3.4	3.0	2.5	0.73	2.49	II V	7.53	Pass
Window 21	4.5	4.5	2.5	0.72	2.8	II V	7.03	Pass
Window 22	3.3	3.3	2.5	0.73	2.32	II V	7.36	Pass
Window 23	3.3	3.7	2.5	0.73	2.21	II V	7.52	Pass
Proposed second floor								
Window 24	3.5	2.8	2.4	0.73	2.71	II V	7.44	Pass
Window 25	4.4	4.5	2.4	0.72	2.81	II V	7.21	Pass
Window 26	4.8	3.2	2.4	0.72	3.5	II V	7.21	Pass
Window 27	4.6	4.2	2.7	0.72	2.8	II V	7.06	Pass
Window 28	4.2	4.6	2.7	0.72	2.47	II V	7.06	Pass
Window 29	4.5	3.2	2.5	0.73	3.21	II V	7.37	Pass
Window 30	3.4	3.0	2.5	0.73	2.49	II V	7.53	Pass
Window 31	4.5	4.4	2.5	0.72	2.82	II V	7.03	Pass
Window 32	3.3	3.3	2.5	0.73	2.32	II V	7.36	Pass
Window 33	3.3	3.7	2.5	0.73	2.21	II V	7.52	Pass

Appendix 2 - Room Depth Calculation 24-28 Warner Street, Camden, London EC1R 5EX

Result

Room	æ	Room Depth Coefficients	Coefficient	s	Room	Room Depth Calculation	culation	Result
	٦	X	I	Rb	L/W + L/H	Ÿ	2/1-Rb	
Proposed Third Floor								
Window 34	3.6	2.9	2.4	0.74	2.74	II V	7.56	Pass
Window 35	4.0	5.9	2.4	0.73	2.34 <=	II V	7.54	Pass
Window 36	3.7	4.5	2.4	0.73	2.36 <=	II V	7.54	Pass
Window 37	5.9	4.0	2.4	0.73	3.93 <=	II V	7.54	Pass
Window 38	3.7	2.8	2.7	0.73	2.69 <=	II V	7.42	Pass
Window 39	8.0	3.8	2.7	0.72	5.07 <=	II V	7.12	Pass
Window 40	8.0	3.8	2.8	0.72	4.96 <=	II V	7.12	Pass
Window 41	3.8	8.0	3.0	0.72	1.74	1.74 <=	7.12	Pass
Window 42	8.0	3.8	2.5	0.72	5.31 <=	II V	7.12	Pass
Window 43	3.0	3.7	2.5	0.73	2.01 <=	II V	7.37	Pass
Window 44	4.4	5.6	2.5	0.72	2.55 <=	II V	7.23	Pass
Window 45	4.4	5.6	2.5	0.72	2.55 <=	II V	7.23	Pass
Window 42	3.1	1.8	2.5	0.7	2.96 <=	II V	6.74	Pass
Proposed Fourth Floor								
Window 46	4.7	4.2	2.3	0.73	3.16 <=	U.	7.48	Pass
Window 47	4.6	4.3	2.9	0.72	2.66 <=	II V	7.09	Pass
Window 48	4.3	4.6	3.0	0.72	2.37 <=	II V	7.09	Pass
Window 49	4.6	4.3	2.5	0.72	2.91 <=	II V	7.09	Pass
Window 50	3.3	4.9	2.5	0.73	1.99	1.99 <=	7.34	Pass
Window 51	3.3	4.9	2.5	0.73	1.99	=> 66.1	7.34	Pass
Window 49	2.2	3.6	2.5	69.0	1.49	U.	6.48	Pass

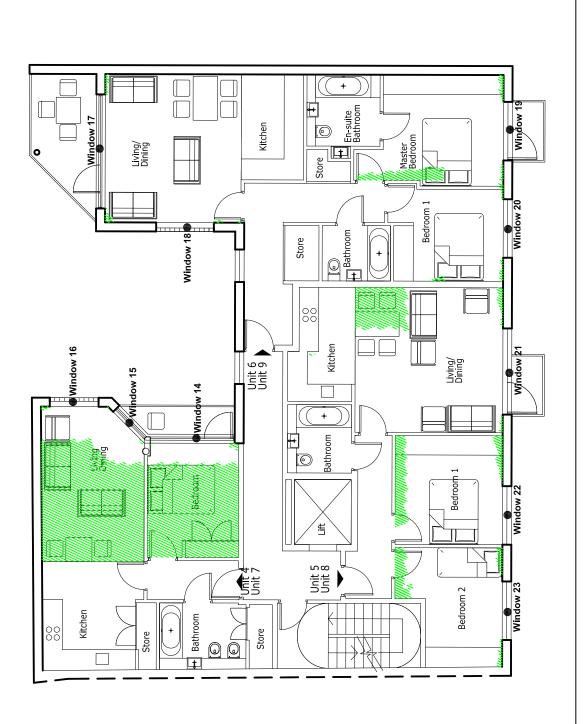
Appendix 2 - Sunlight to Windows 24-28 Warner Street, Camden, London EC1R 5EX

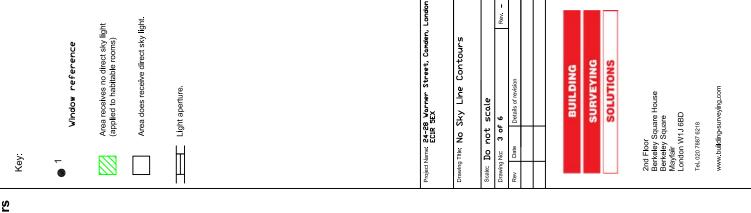
Reference	Use Class	Annual Probable Sunlight Hours	Sunlight Hours
		Total	Winter
Proposed Ground Floor			
Window 9	Living Room	3%	%0
Window 10	Living Room	19%	2%
Proposed First Floor			
Window 17	Living Room	2%	%0
Window 18	Living Room	29%	%2
Proposed Second floor			
Window 27	Living Room	20%	4%
Window 28	Living Room	38%	11%
Proposed Third Floor			
Window 39	Living Room	51%	19%
Window 40	Living Room	49%	20%
Proposed Fourth Floor			
Window 47	Living Room	%09	20%

APPENDIX 3	
NO SKY LINE CONTOURS	

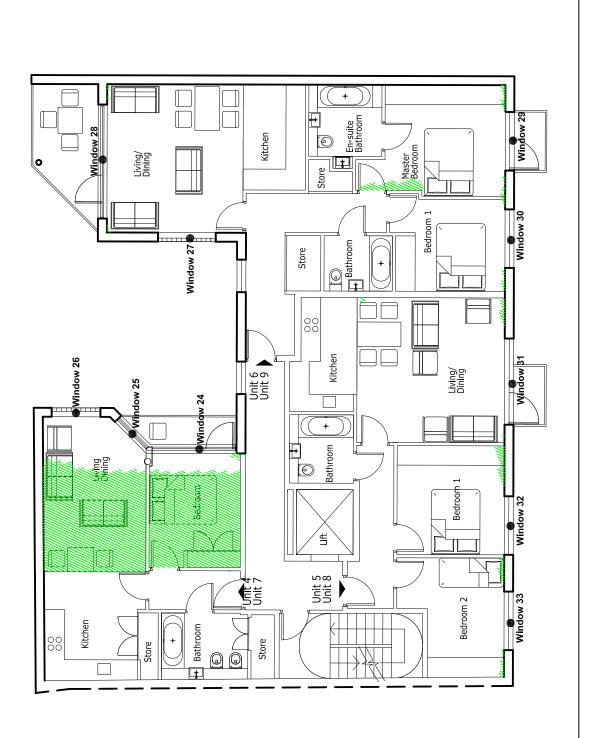


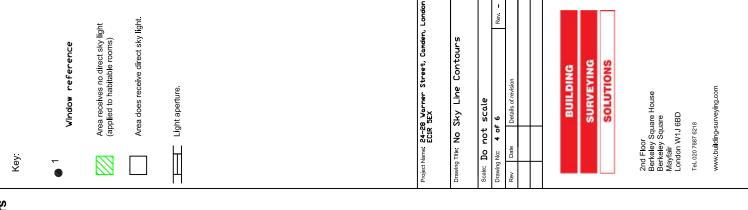


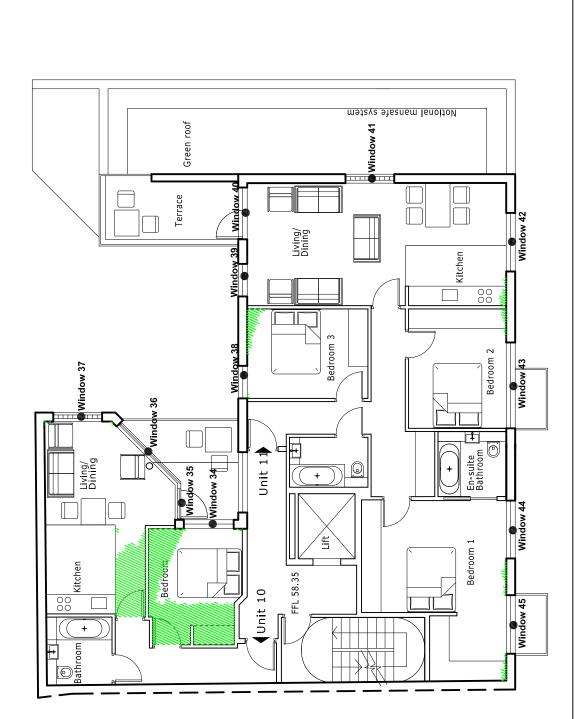


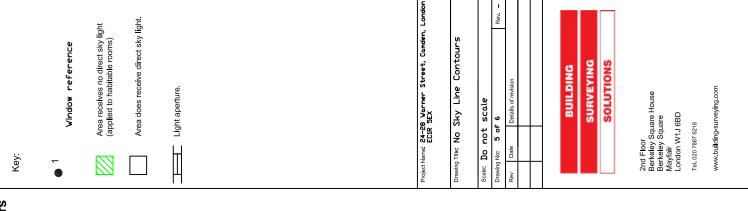


Proposed Second Floor



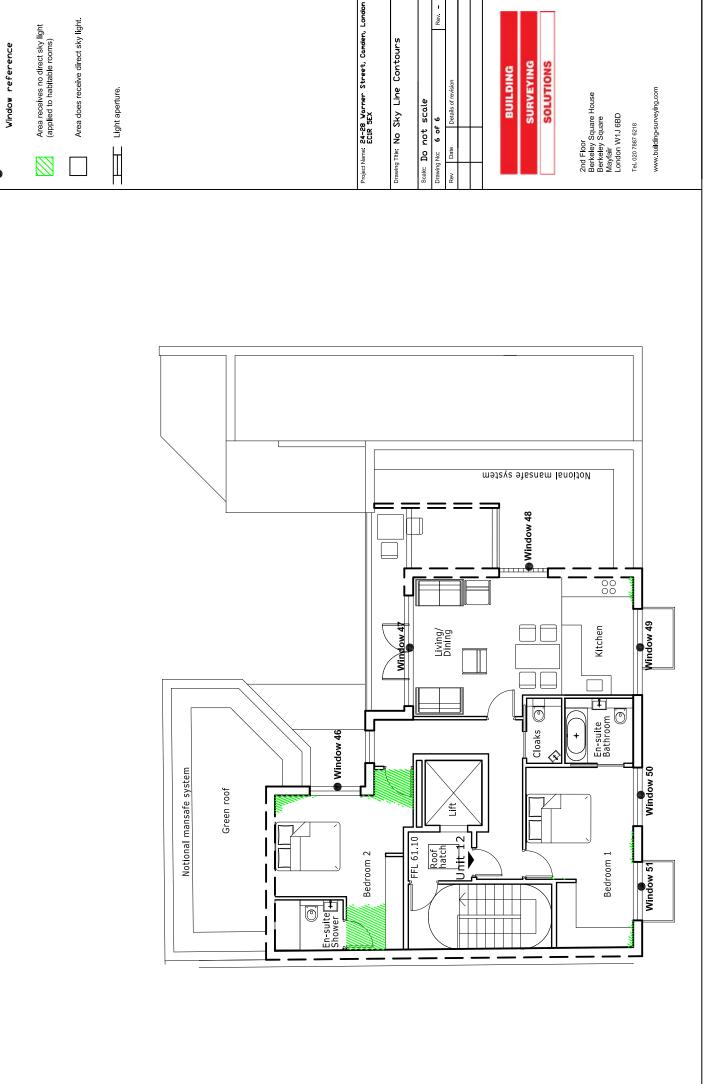






Key.

Proposed Fourth Floor



Rev