FUTURE
PLANNING AND DEVELOPMENT

13 Murray Mews, London NW1 9RJ

DAYLIGHT & SUNLIGHT ASSESSMENT

Development of new-build house

June 2023

Document Issue Register

1.0 Planning Issue

Contents

1 Introduction

1.1 This report details a Daylight & Sunlight Assessment for the proposed development at 13 Murray Mews, London NW1 9RJ. The proposed development consists of a new three-storey house. The accommodation comprises of 3no. double bedrooms, and an open-plan living/kitchen/dining room.

1.2 The purpose of this report is to perform a daylight and sunlight assessment for the habitable rooms of the surrounding properties and within the proposed development, and to compare with guidance provided by the BRE (BR209: Site Layout Planning for Daylight and Sunlight 2022) along with The British Standard 'Daylight in buildings' (BS EN 17037) and CIBSE Guide LG10 – Daylighting and Window Design.

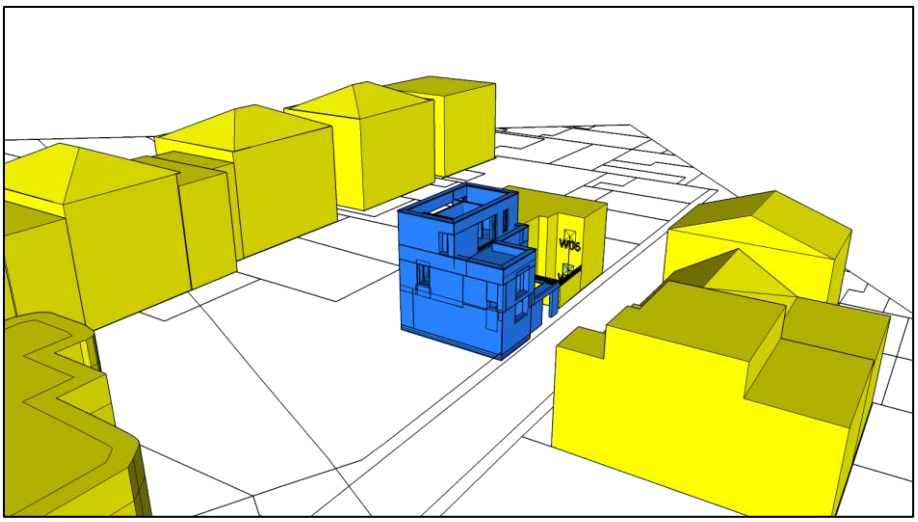

Figure 1: Proposed development (blue), 3D Daylight (VSC) model

2 Executive Summary

2.1 There are two components of natural light which need to be considered when assessing the impact of a proposed development on the surrounding residential properties, being the level of daylight and the annual probable sunlight hours. In terms of daylight levels to a window, the BRE recommends a Vertical Sky Component (VSC) of 27%, or not less than 0.8 times its former level. The 27% figure relates to low-density suburban housing.

2.2 The results of the daylight assessment indicate that all of the assessed neighbouring residential windows would retain a VSC of above 27% or not less than 0.8 times their former level. Thus the reduction in daylight levels to these windows would not be noticeable, according to the BRE.

2.3 In terms of Annual Probable Sunlight Hours (APSH), the assessed windows which face within 90° of due south, have been shown to receive acceptable levels of annual sunlight, according to the BRE.

2.4 The values of daylight levels and annual sunlight hours are considered to be acceptable for all neighbouring residential buildings according to the BRE guidance.

2.5 The Daylight Factor (DF) is a measure of the percentage of horizontal diffuse illumination outdoors (daylight) received within an internal environment.

2.6 The British Standard 'Daylight in buildings' (BS EN 17037) recommends a minimum DF in London/surrounds (to be achieved over at least 50% of the assessment grid) of 0.7% for bedrooms, 1.1% for living rooms and 1.4% for kitchens.

2.7 The results of this investigation indicate that all the assessed habitable spaces within the proposed development meet the recommended minimum area (50%) for

the target DF levels, therefore these zones are considered to be adequately daylit according to the BRE guidance.

2.8 A summary of the DF calculation results is presented below:

Room	Target DF (%)	Min. Area > DF	Area > DF
BED1	0.7	50%	99.0%
BED2	0.7	50%	65.9%
BED3	0.7	50%	100.0%
LKD	1.1	50%	54.9%

Figure 2: 13 Murray Mews, London – Aerial view (source: Google Earth)

3 Planning Policies and Guidance

3.1 BRE Document 209 – Site Layout Planning for Daylight and Sunlight

3.2 The introduction to the BRE document 209: *Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice –3rd edition (Paul Littlefair, 2022)* states:

> *"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; it's 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. In special circumstances the developer or Planning Authority may wish to use different target values. For example, in a historic city centre, or in an area with modern high-rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings."*

3.3 National Planning Policy Framework 2021

3.4 Furthermore, the National Planning Policy Framework 2021 states that:

> *"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)."*

4 Methodology

4.1 Measurement of Daylight

4.2 There are three mechanisms for determining the daylight levels to a window or room:

1. Vertical Sky Component (VSC)
2. No Sky Contours (NSC)
3. Daylight Factor (DF) or Illuminance (Lux)

4.3 If a proposed development will fall beneath a 25° angle taken from the centre of the lowest window at an existing property, then no further assessment will be required. Furthermore, if the centre of a main window of the next door property lies on the extension side of a 45° line drawn in plan and elevation, then the extension may well cause a significant reduction in the skylight received by the window.

4.4 Vertical Sky Component (VSC)

4.5 The VSC methodology is defined as:

4.6 *'Ratio of that part of illuminance, at a point on given vertical plane, that is received directly from a CIE Standard Overcast Sky, to illuminate on a horizontal plane due to an unobstructed hemisphere of this sky'.*

4.7 The VSC for a completely unobstructed CIE Standard Overcast Sky is 39.6%. The BRE guideline VSC for an existing window in a habitable room is 27%, or not less than 0.8 times its former value. This figure has been derived from a low-density suburban housing model. The BRE advises that these values are:

4.8 *"..purely advisory and different targets may be used based on the special requirements of the proposed development or its location."*

4.9 No Sky Contours (NSC)

4.10 The 2nd and 3rd methods (NSC and DF) require knowledge of the internal layout of the property being assessed, whilst the 1st method is determined solely on the external skyline obstructions. In this instance it is appropriate to assess the neighbouring properties based on the 1st method (VSC), whilst reasonable assumptions can be made with regards to internal geometry and surface finishes, in order to assess the NSC and ADF of neighbouring properties.

4.11 Daylight Factor (DF)

4.12 The Daylight Factor (DF) is a measure of the percentage of horizontal diffuse illumination outdoors (daylight) received within an internal environment. The British Standard 'Daylight in buildings' (BS EN 17037) recommends a minimum DF in London/surrounds (to be achieved over at least 50% of the assessment grid) of:

- 0.7% for bedrooms;
- 1.1% for living rooms; and
- 1.4% for kitchens.

4.13 The Daylight Factor (DF) is largely dependent on the geometry of the room and the window sizes, thus the drawings of the proposed development have been analysed and modelled. Analysis has been performed using the 'FlucsDL' software module within the IES Virtual Environment.

4.14 Additional variables include:

- Diffuse transmittance of the glass (including dirt factor)
- Angle subtended by sky visible from the centre of the window
- Total area of internal surfaces
- Reflectance of internal surfaces.

4.15 Measurement of Sunlight

4.16 The sunlight to a given window can be quantified using the Annual Probable Sunlight Hours (APSH) method. The unobstructed total in London (latitude 51.5°N) and southern England equates to 1486 hours. An indicator is provided in the BRE guide which is overlaid with 100 spots, each representing approximately 15 hours. Each spot which is uncovered by an obstruction can thus be counted to provide a single percentage of total APSH.

4.17 A more accurate estimation of the annual sunlight hours can be determined through numerical simulation, using a 3D model of the site including any surrounding obstructions. The sunlighting analysis has been performed using the 'Suncast' software module within the IES Virtual Environment.

4.18 The guideline criteria for assessing annual sunlight at a reference point (centre of window) of the main living room of an existing building is that it should receive 25% of APSH including at least 5% of APSH in winter or not less than 0.8 times its former value.

4.19 According to the BRE guidance, it is not always necessary to do a full calculation to check sunlight potential. The guideline above is met if the following is true:

- If the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window (obstructions within 90° of due north of the existing window need not count here);
- The window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal (again, obstructions within 90° of due north of the existing window need not be counted);
- The window wall faces within 20° of due south and the reference point has a VSC of 27% or more.

5 Daylight & Sunlight Analysis of Surrounding Properties

5.1 The surrounding residential properties which have been assessed include the following:

1. 8 Murray Mews
2. 6 Murray Mews
3. 15 Murray Mews
4. r/o Camden Square

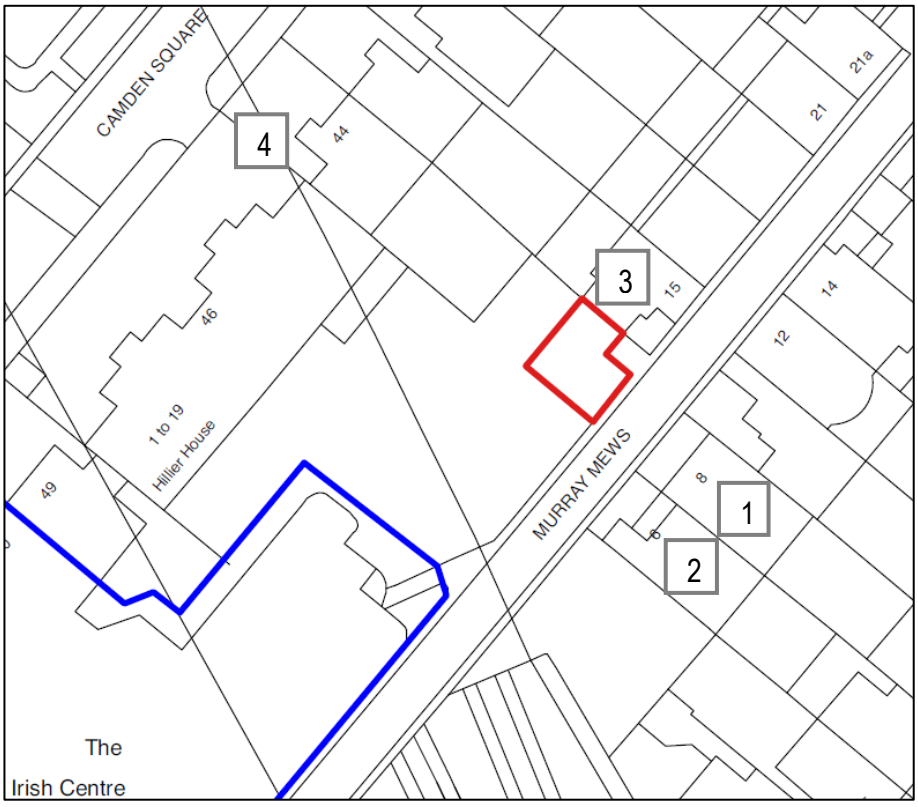

Figure 3: Location Plan – surrounding properties

5.2 6 & 8 Murray Mews

5.3 The properties: 6 Murray Mews (right) & 8 Murray Mews (left) are shown below (view from north, source: Bing Maps). The buildings each comprise 3 storeys, with front façade facing toward the site of the proposed new development.

5.4 The centre point of the windows of the of the lowest floor (ground floor), have been taken as the point of reference for VSC calculations, according to BRE guidance.

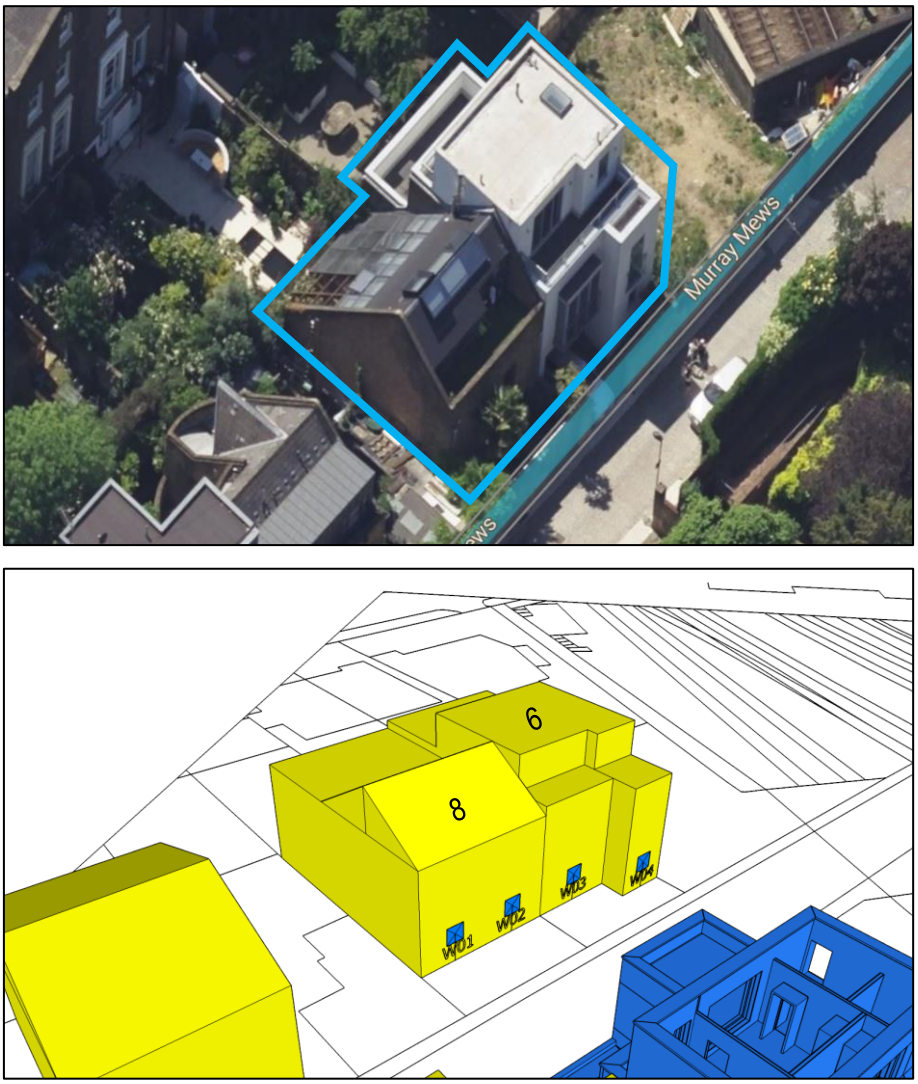

Figure 4&5: 6 & 8 Murray Mews (Aerial view and 3D model)

5.5 15 Murray Mews

5.6 The front and side of the property are shown below, the building is a dwellinghouse (view from south, source: Bing Maps). The building comprises 2 storeys, with recessed side façade facing toward the site of the proposed new development.

5.7 The centre point of windows facing toward the proposed development have been taken as the point of reference for VSC calculations, according to BRE guidance.

Figure 6&7: 15 Murray Mews (Aerial view and 3D model)

5.8 r/o Camden Square

5.9 The rear of the properties along Camden Square are shown below, the buildings comprised multi-storey residential buildings. The rear façade faces toward the site of the proposed new development.

5.10 The proposed development falls beneath a 25° angle taken from the centre of the lowest windows, therefore no further assessment will be required.

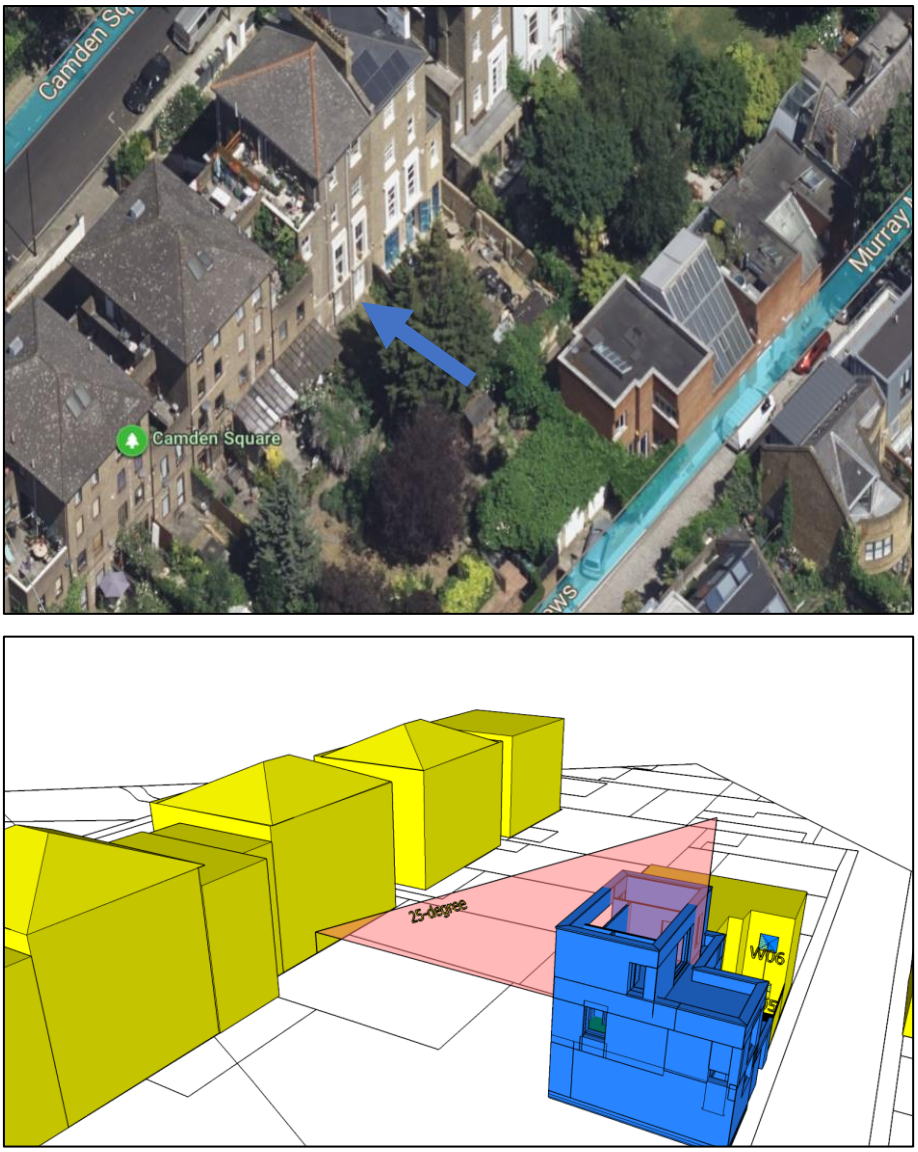

Figure 8&9: Rear of Camden Square (Aerial view and 3D model

5.11 **Results of Daylight Analysis**

5.12 A Vertical Sky Component (VSC) assessment criteria of 27% is usually adopted, however the BRE advises that in certain situations, lower values can be acceptable. For example, if the existing VSC is below 27%, then the target VSC would be not less than 0.8 times its former value.

5.13 The results of the daylight assessment indicate that all of the assessed windows would retain a VSC of above 27%, or not less than 0.8 times their former value, thus the reduction in daylight levels to the neighbouring windows would not be noticeable according to the BRE.

Win ID	Window Location	Existing VSC (%)	Proposed VSC (%)	Ratio	Notes:
W1	8 Murray Mews	32.14	28.26	0.88	Reduction of 12.1%
W2	8 Murray Mews	32.51	29.13	0.90	Reduction of 10.4%
W3	6 Murray Mews	30.58	28.20	0.92	Reduction of 7.8%
W4	6 Murray Mews	32.62	30.61	0.94	Reduction of 6.1%
W5	15 Murray Mews	23.31	18.69	0.80	Reduction of 19.8%
W6	15 Murray Mews	30.17	26.17	0.87	Reduction of 13.3%

5.14 Results of Sunlight Analysis

5.15 The assessed window W5 faces within 90° of due south and serves a living room, therefore sunlight analysis has been undertaken on this window according to the BRE guidance. The living/reception room is dual aspect (see figure 10 below).

5.16 The guideline criteria for assessing annual sunlight at a reference point (centre of window) of the main living room of an existing building is that it should receive 25% of APSH including at least 5% of APSH in winter or not less than 0.8 times its former value.

5.17 The results of the sunlight analysis indicates that the assessed window has been shown to pass the APSH tests (annual & winter). The results are presented below:

Win ID	Window Location	Orien-tation	Annual (%)	Summer (%)	Winter (%)	Annual Result	Winter Result
W5	15 Murray Mews	226.18	26.85	18.09	8.76	Pass	Pass

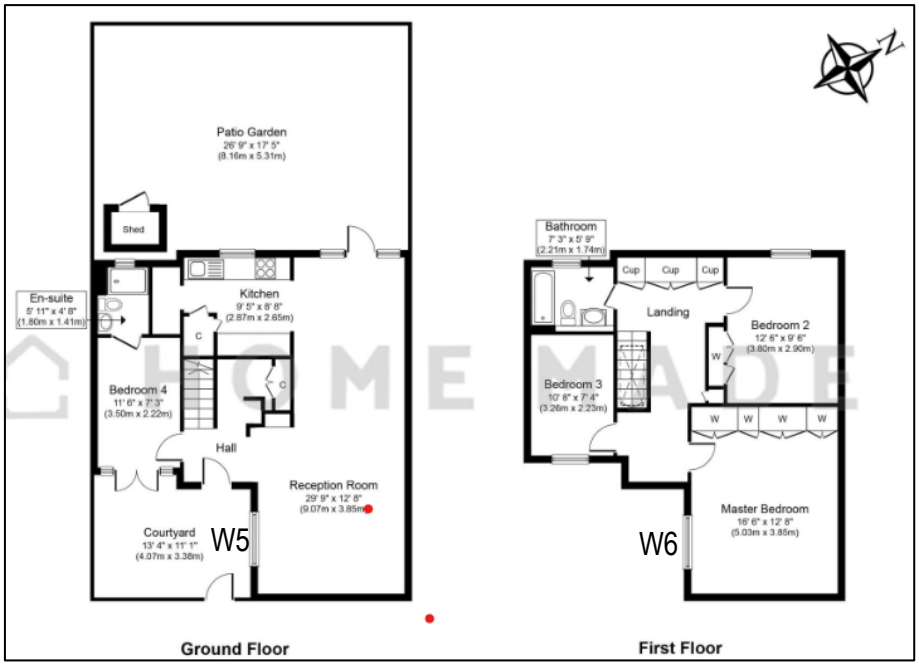

Figure 10: 15 Murray Mews – Floor Plans

6 Daylight Factor Calculation Results (within Proposed Development)

6.1 The proposed development consists of a new three-storey house. The accommodation comprises of 3no. double bedrooms, and an open-plan living/kitchen/dining room.

6.2 The purpose of the analysis is to perform a Daylight Factor (DF) Assessment for the habitable spaces within the proposed residential unit, and to compare with guidance provided by the BRE (BR209: Site Layout Planning for Daylight and Sunlight 2022) along with The British Standard 'Daylight in buildings' (BS EN17037) and CIBSE Guide LG10 – Daylighting and Window Design.

6.3 The Daylight Factor (DF) is a measure of the percentage of horizontal diffuse illumination outdoors (daylight) received within an internal environment. The British Standard 'Daylight in buildings' (BS EN 17037) recommends a minimum DF in London/surrounds (to be achieved over at least 50% of the assessment grid) of 0.7% for bedrooms, 1.1% for living rooms and 1.4% for kitchens.

6.4 The following assumptions have been made with regards to reflectance and transmittance values of internal surfaces:

Internal Element:	Reflectance	Transmittance
Walls	0.50	N/A
Ceilings	0.70	N/A
Floor	0.20	N/A
External Window	0.07	0.65

6.5 The results of this investigation indicate that all the assessed habitable spaces meet the recommended minimum area (50%) for the target DF levels, therefore these zones are considered to be adequately daylit according to the BRE guidance.

6.6 The following images depict a visual representation of the daylight factor achieved throughout the assessed zones (image generated through the FlucsDL package within the IES-Virtual Environment). The summary results for the proposed development are also presented, with full details in Appendix 1:

Summary DF Results:

Room	Target DF (%)	Min. Area > DF	Area > DF
BED1	0.7	50%	99.0%
BED2	0.7	50%	65.9%
BED3	0.7	50%	100.0%
LKD	1.1	50%	54.9%

Visual Representation of Daylight Factor:

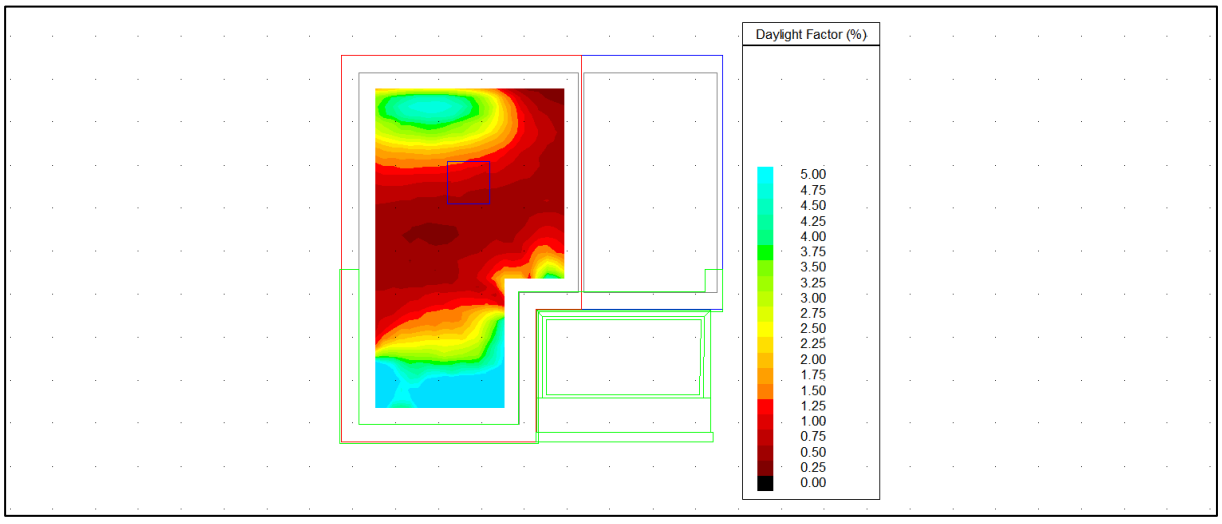

Figure 11: LKD - Daylight Distribution on working plane

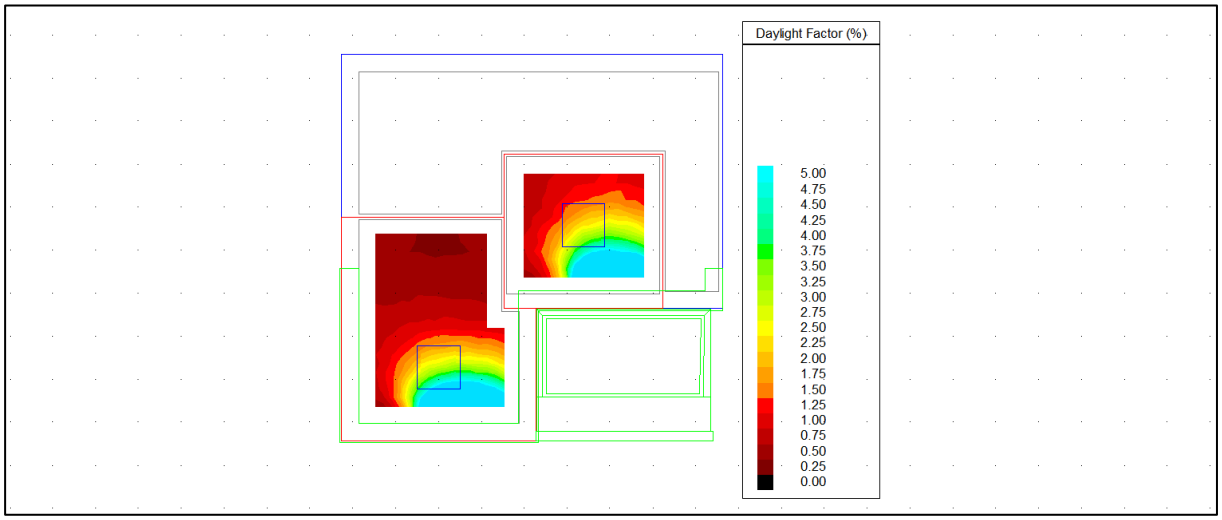

Figure 12: BED 1&2 - Daylight Distribution on working plane

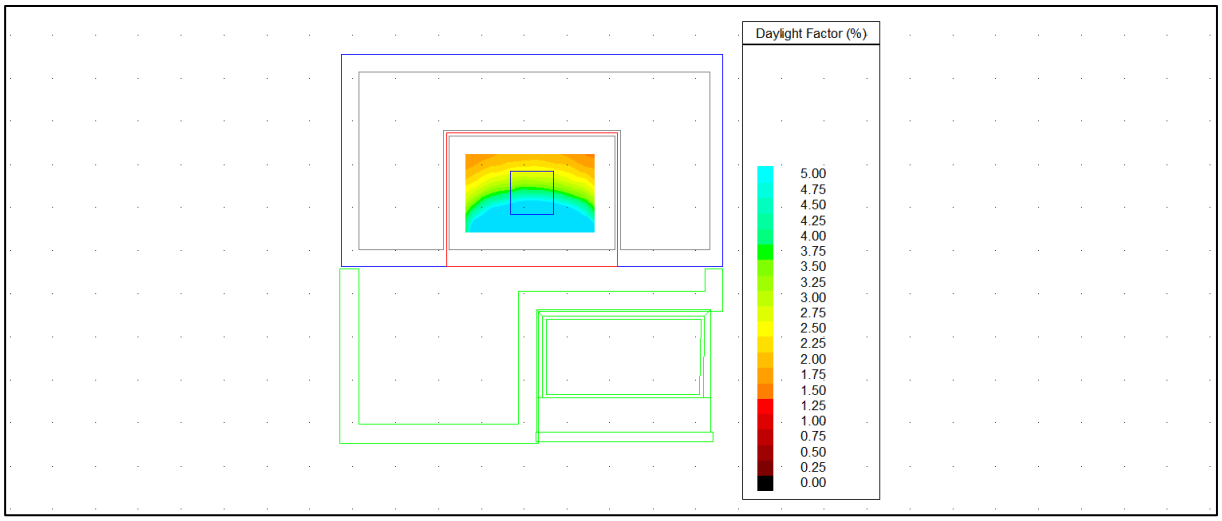

Figure 13: BED 3 - Daylight Distribution on working plane

7 Conclusion

7.1 This report has detailed a Daylight & Sunlight Assessment for the proposed development at 13 Murray Mews, London NW1 9RJ. The proposed development consists of a new three-storey house. The accommodation comprises of 3no. double bedrooms, and an open-plan living/kitchen/dining room.

7.2 The results of the daylight assessment indicate that all of the assessed neighbouring residential windows would retain a VSC of above 27% or not less than 0.8 times their former level. Thus the reduction in daylight levels to these windows would not be noticeable, according to the BRE.

7.3 In terms of Annual Probable Sunlight Hours (APSH), the assessed windows which face within 90° of due south, have been shown to receive acceptable levels of annual sunlight, according to the BRE.

7.4 The values of daylight levels and annual sunlight hours are considered to be acceptable for all neighbouring residential buildings according to the BRE guidance.

7.5 The Daylight Factor (DF) is a measure of the percentage of horizontal diffuse illumination outdoors (daylight) received within an internal environment.

7.6 The British Standard 'Daylight in buildings' (BS EN 17037) recommends a minimum DF in London/surrounds (to be achieved over at least 50% of the assessment grid) of 0.7% for bedrooms, 1.1% for living rooms and 1.4% for kitchens.

7.7 The results of this investigation indicate that all the assessed habitable spaces within the proposed development meet the recommended minimum area (50%) for the target DF levels, therefore these zones are considered to be adequately daylit according to the BRE guidance.

8 Appendix 1: Daylight Factor Calculation Results (within Proposed Development)

Daylight Analysis

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Analysis Overview

Analysis Comparison (against previous assessment)

	Total	Comparison (with previous)
Daylight levels (lux)	348.806	**Increased**
Percentage area above threshold (%)	84.1	**Increased**

Analysis History

Date / Time	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
27 Jun 2023 at 18:31	2.1	261.711
27 Jun 2023 at 18:32	2.6	320.628
27 Jun 2023 at 18:38	1.9	237.796
27 Jun 2023 at 18:38	1.9	237.796

Threshold Calculation

Building Results

Total floor area (m^2)	Total floor area above threshold (m^2)	Percentage floor area above threshold (%)	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
26.569	22.351	84.1	2.9	348.806

Rooms included in the analysis

Room ID	Room name	Working plane	Floor area (m^2)	Floor area > threshold (m^2)	Percentage floor area > threshold (%)	Average illumination (%)
01000001	01 BED1	0	7.753	7.673	**99.0**	2.80
01000000	01 BED2	0	12.144	8.006	**65.9**	1.95
02000003	02 BED3	0	6.673	6.673	**100.0**	4.58

Rooms not included in the analysis

Things to consider:

Increase amount of **glazing** (assess **trade-off** with energy consumption)

Evaluate size and shape of glass (glass **above** 2.3m (7'6") has **greater impact**)

Select a **glass type** with a different **visible transmittance** (Tvis)

Evaluate other daylighting metrics such as **glare**

Room ID	Room name	Reason
RM000006	15 MURRAY MEWS	Not selected for inclusion in report
00000000	00	Not selected for inclusion in report
00000001	00 LKD	Not selected for inclusion in report
01000002	01	Not selected for inclusion in report
02000002	02	Not selected for inclusion in report

Calculation Data

Location: London Heathrow, United Kingdom(51.48 N, 0.45 W)

Calculated: 29 Jun 2023 at 10:06
Sky Model: CIE Standard Overcast Sky
Working plane height: 0.850m
Grid Size: 0.200m
Illuminance Threshold (%): 0.70
Light Penetration:
With light penetration through internal windows

Daylight Analysis

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Analysis Overview

Analysis Comparison (against previous assessment)

	Total	Comparison (with previous)
Daylight levels (lux)	261.711	**No previous**
Percentage area above threshold (%)	54.9	**No previous**

Analysis History

Date / Time	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)

Threshold Calculation

Building Results

Total floor area (m^2)	Total floor area above threshold (m^2)	Percentage floor area above threshold (%)	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
30.108	16.522	54.9	2.1	261.711

Rooms included in the analysis

Room ID	Room name	Working plane	Floor area (m^2)	Floor area > threshold (m^2)	Percentage floor area > threshold (%)	Average illumination (%)
00000001	00 LKD	0	30.108	16.522	**54.9**	2.14

Rooms not included in the analysis

Room ID	Room name	Reason
RM000006	15 MURRAY MEWS	Not selected for inclusion in report
00000000	00	Not selected for inclusion in report
01000001	01 BED1	Not selected for inclusion in report
01000000	01 BED2	Not selected for inclusion in report
01000002	01	Not selected for inclusion in report

Things to consider:

Increase amount of **glazing** (assess **trade-off** with energy consumption)

Evaluate size and shape of glass (glass **above** 2.3m (7'6") has **greater impact**)

Select a **glass type** with a different **visible transmittance** (Tvis)

Evaluate other daylighting metrics such as **glare**

Room ID	Room name	Reason
02000002	02	Not selected for inclusion in report
02000003	02 BED3	Not selected for inclusion in report

Calculation Data

Location: London Heathrow, United Kingdom(51.48 N, 0.45 W)

Calculated:	27 Jun 2023 at 18:31
Sky Model:	CIE Standard Overcast Sky
Working plane height:	0.850m
Grid Size:	0.200m
Illuminance Threshold (%):	1.10

Light Penetration:
With light penetration through internal windows