The Firs, Church Grove, Hampton Wick

Daylight & Sunlight Assessment

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Contents

1 Introduction

1.1 Introduction

1.1.1 Brooks Development Practice Ltd was instructed by Flower Michelin to prepare a Daylight and Sunlight Assessment for the proposed development at The Firs, Church Grove, Hampton Wick, KT1 4AL.

1.1.2 The purpose of this report is to assess the skylight and sunlight levels of the proposed development and to assess the impact that the proposed development may have on the skylight and sunlight of the existing surrounding buildings, in accordance with guidance set out in *BRE Report 209, Site Layout Planning for Daylight and Sunlight: A guide to good practice, Second Edition, 2011 (BR 209),* and *BS 8206-2 Code of Practice for Daylighting.*

1.1.3 This report is not to be used to determine any right to light for existing building windows. This report has been carried out using guidelines set out in BR 209 and cannot be used to replace or satisfy the legal requirements surrounding the right to light. The assessment of loss of light in rights to light cases is carried out in a different way to the methods used in BR 209 and this report. It should not be assumed that if the guidelines in BR 209 are satisfied within this report that a proposed development will not infringe rights to light. If there is a concern over right to light then an appropriately qualified person should be employed to investigate.

1.2 3D Models

1.2.1 Two 3D models have been developed. The first model is of the existing development and existing nearby buildings. The second model is of the proposed development and existing nearby buildings. These are shown in Figures 1 and 2.

1.2.2 LightUp Analytics, a program specifically developed to assess 3D models in accordance with guidance provided in BR 209, has been used.

1.2.3 Trees have not been modelled because daylight and sunlight is scarcest and most valuable in winter when the trees won't be in leaf.

1.2.4 For the purposes of the Average Daylight Factor (ADF) calculations, and room depth check, the area-weighted average reflectance of the room surfaces has been calculated on the assumption that the rooms have a white ceiling (0.85), light (pale cream) coloured walls (0.81) and light coloured carpet/light wood flooring (0.4). The maintenance factor has been calculated as 0.92 for the majority of windows and 0.76 for windows sheltered by balconies. The glass transmission factor has been assumed to be 0.68 and the frame factor has been assumed to be 0.7.

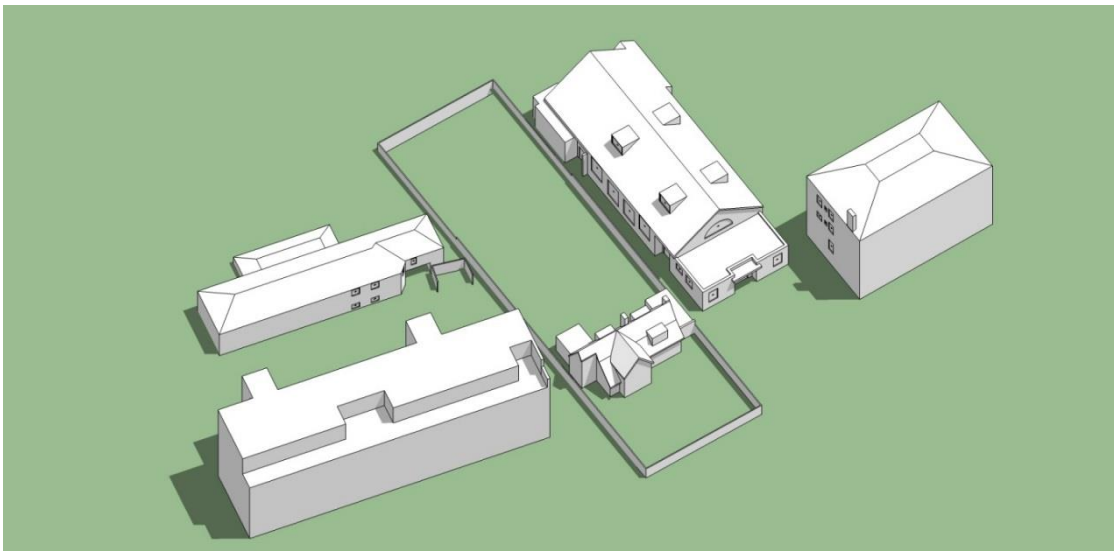

Figure 1 – Development area before proposed development

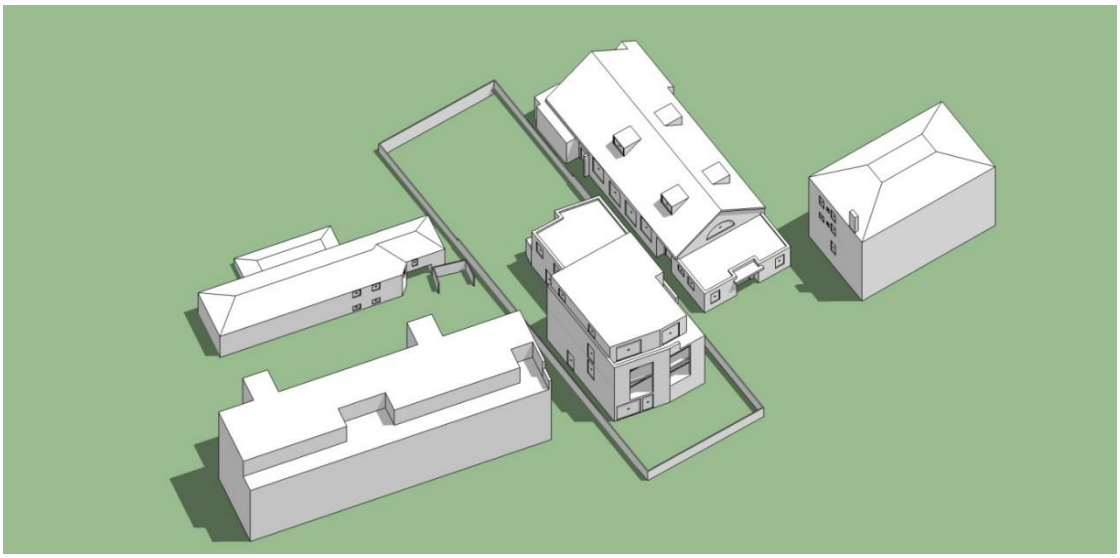

Figure 2 – Development area after proposed development

1.2.5 For ease of reference, Figures 3 to 4 label the windows of the existing surrounding buildings assessed.

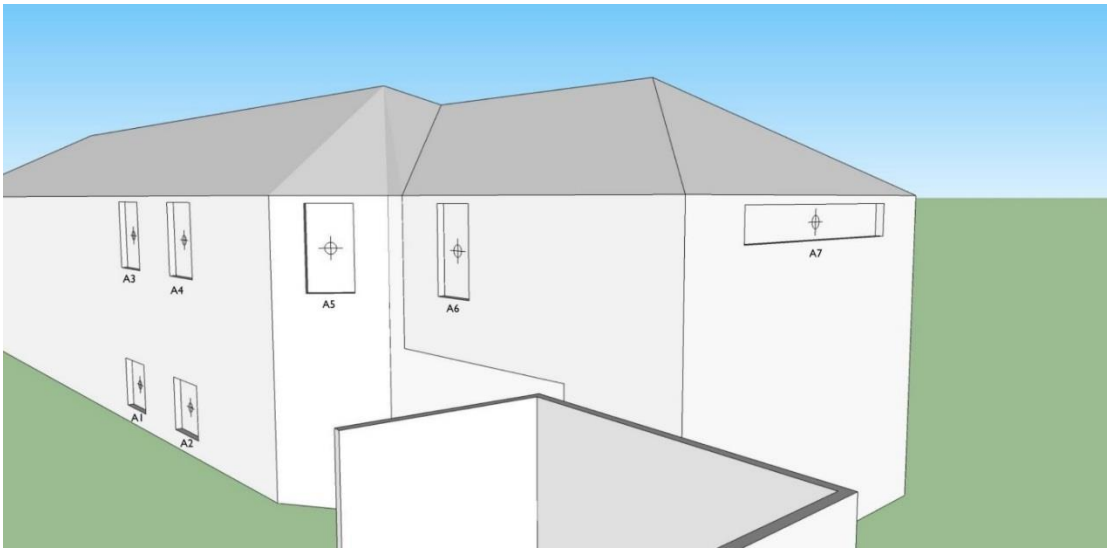

Figure 3 – Existing Windows on South West and South East Elevations of Heron Mews (A)

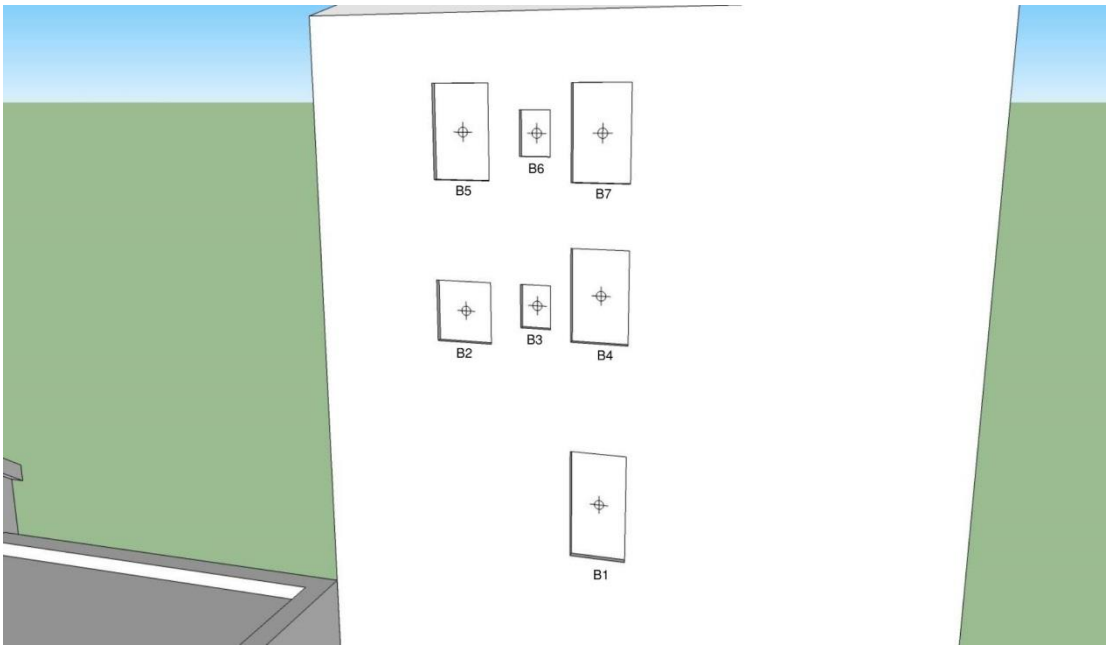

Figure 4 – Existing Windows on North West Elevation of 8 Park View (B)

2 Assessment

2.1 Skylight – Vertical Sky Component (VSC) – New Development

2.1.1 BR 209 Paragraph 2.1.6 states:

> The amount of daylight a room needs depends on what it is being used for but roughly speaking, if… (the) VSC is at least 27%, conventional window design will usually give reasonable results.

2.1.2 Figures 5 to 8 provide a record of the assessment of the vertical sky component of the windows assessed. The boundary between the model and the yellow banding represents a VSC of 27%. All areas with a VSC above 27% are white. All areas with a VSC below 27% are coloured. Lighter colours show areas with a VSC just below 27% and darker colours show area with a VSC further below 27%. It should be noted that it is possible to achieve good skylight levels in rooms even with a VSC below 27%.

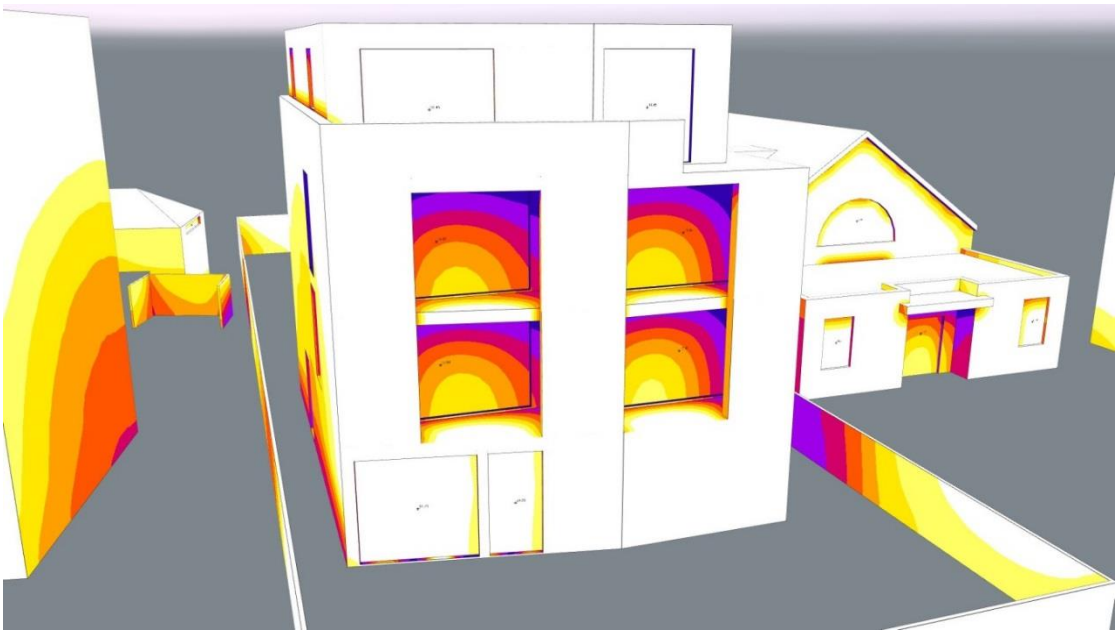

Figure 5 - VSC of the South West Elevation

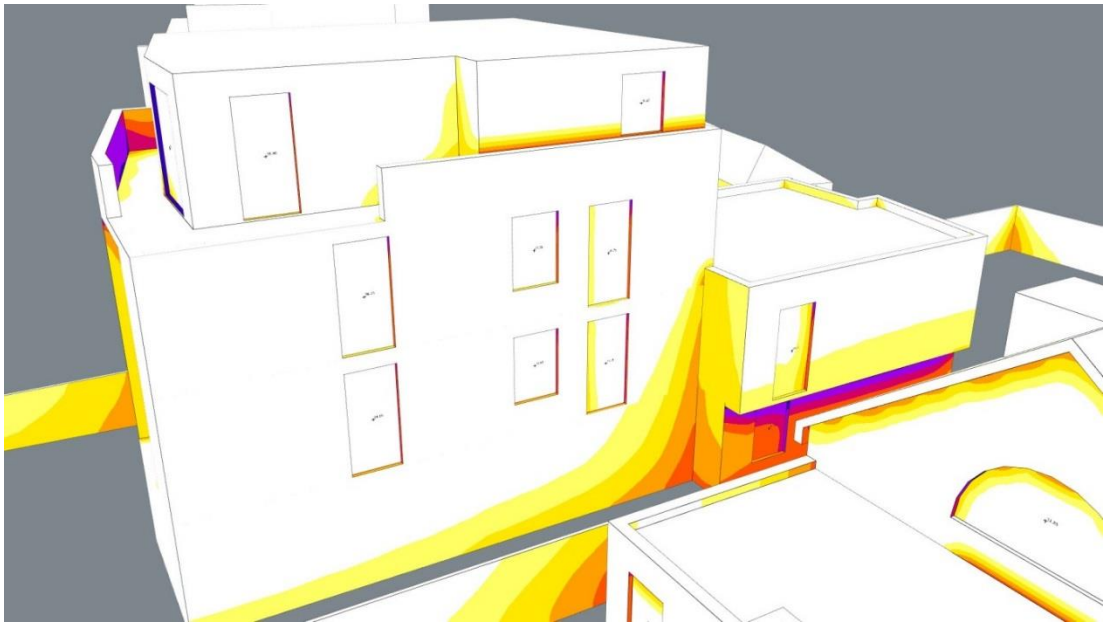

Figure 6 - VSC of the South East Elevation

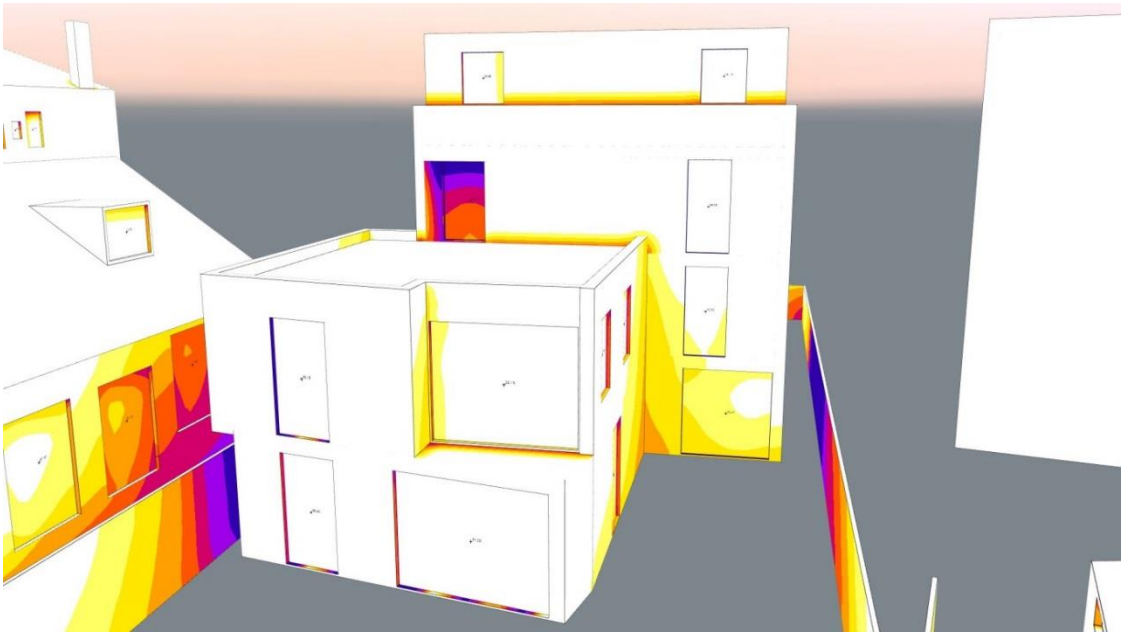

Figure 7 - VSC of the North East Elevation

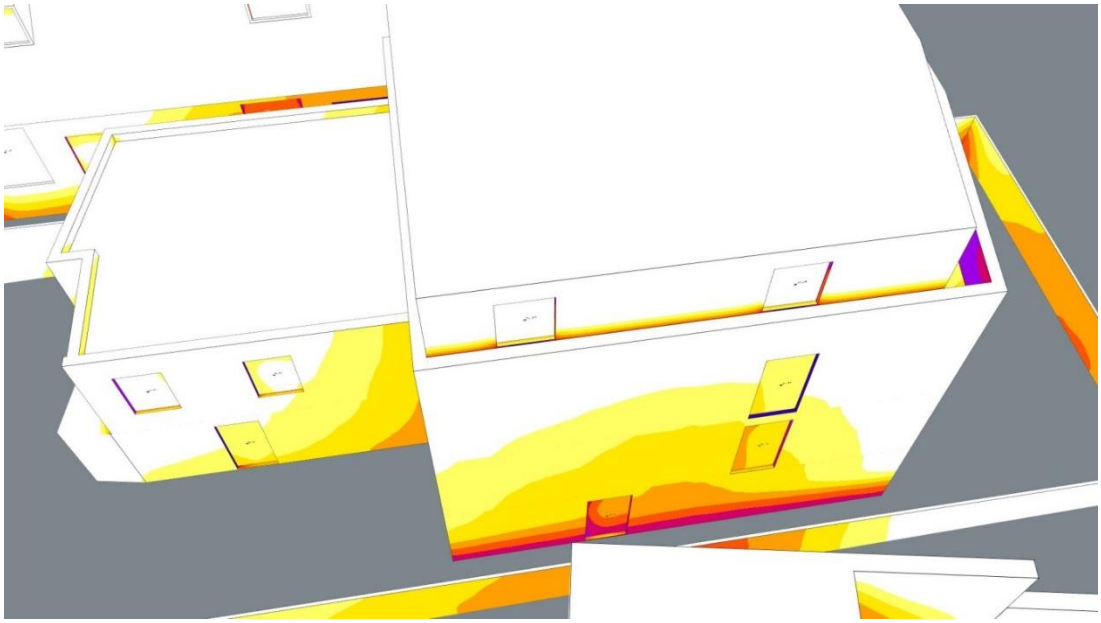

Figure 8 - VSC of the North West Elevation

2.2 Skylight – Average Daylight Factors (ADFs) – New Development

2.2.1 BR 209 Paragraph 2.1.8 states:

> Daylight provision in new rooms may be checked using the average daylight factor (ADF). The ADF is a measure of the overall amount of daylight in a space. BS 8206-2 Code of practice for daylighting…gives minimum values of ADF of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms.

2.2.2 BS 8206-2 Paragraph 5.6 further explains that:

> Where one room serves more than one purpose, the minimum average daylight factor should be that for the room type with the highest value. For example, in a space which combines a living room and a kitchen the minimum average daylight factor should be 2%.

2.2.3 Figures 9 to 12 provide a record of the assessment of the ADFs of the 4 proposed dwellings. Figures highlighted in green achieve the numerical target values stated in BR 209. Figures highlighted in orange fall below the numerical target values stated in BR 209. Figures have been given to one decimal place in order to demonstrate whether the values stated in BR 209 have been met. However, when reviewing the ADFs, it is recommended that Peter Tregenza and Michael Wilson's observation below is taken into consideration.[1]

> We can say that there is a significant difference, in both the subjective character and the physical environment between a room with an average daylight factor of 2% and one with an average daylight factor of 5%. There may be a noticeable difference between rooms with daylight factors of 2% and 3%. However, not only would a difference between 2% and 2.1% be almost certainly subjectively unnoticeable, but such a distinction would be completely unjustified scientifically. The level of uncertainty in the parameters and the simplifying assumptions in the models preclude such pretensions to precision. Average daylight factor calculations have little absolute meaning beyond the decimal place.

[1] Tregenza, P. and Wilson, M. (2011) *Daylighting: Architecture and Lighting Design*. Abingdon: Routledge.

Figure 9 - ADFs of Units 1 and 2

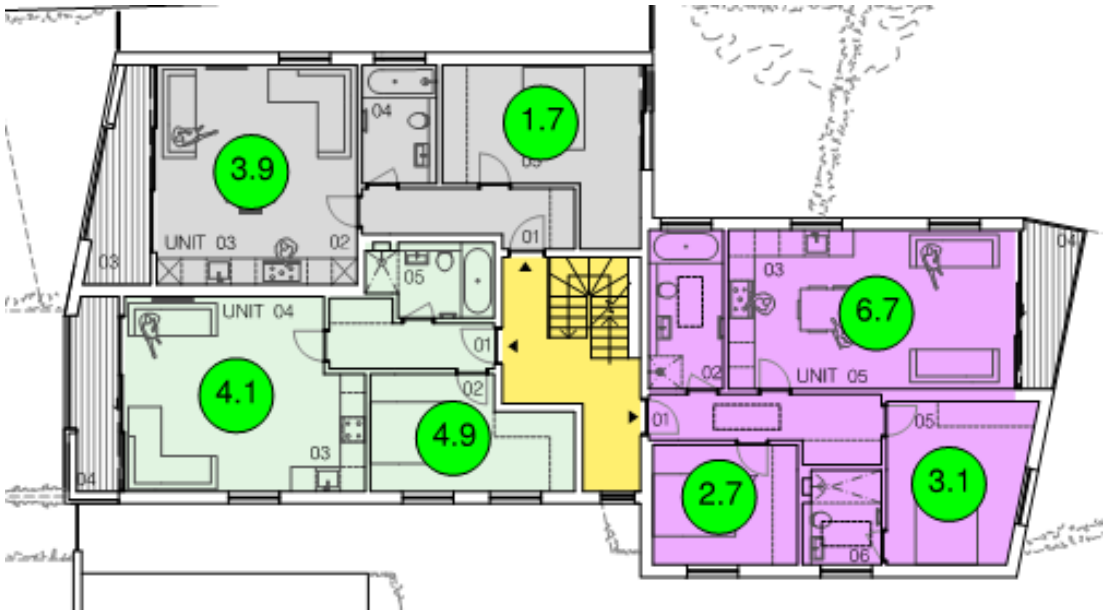

Figure 10 – ADFs of Units 3, 4 and 5

Figure 11 – ADFs of Units 6 and 7

Figure 12 – ADFs of Units 8 and 9

2.3 Skylight – No Sky Line – New Development

2.3.1 BR 209 Paragraph C16 states:

> If a significant area of the working plane (normally more than 20%) 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.

2.3.2 Table 1 provides a record of the percentage of each room that receives no direct skylight.

Table 1: No Sky Line. Percentages of rooms that receive no direct skylight

Unit	Room	% of room that receives no direct skylight
1	Kitchen/Living/Dining	10.0
	Bed 1	0.0
2	Kitchen/Living/Dining	4.8
	Bed 1	0.0
	Bed 2	14.3
3	Kitchen/Living/Dining	0.0
	Bed 1	7.3
4	Kitchen/Living/Dining	0.0
	Bed 1	0.0
5	Kitchen/Living/Dining	0.0
	Bed 1	3.9
	Bed 2	2.4
6	Kitchen/Living/Dining	1.0
	Bed 1	7.3
7	Kitchen/Living/Dining	0.0
	Bed 1	0.0
8	Kitchen/Living/Dining	0.0
	Bed 1	0.0
9	Kitchen/Living/Dining	0.0
	Bed 1	0.0

2.4 Skylight – Room Depth – New Development

2.4.1 BR 209 paragraphs C13 and C14 state:

> 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:
>
> $(L/W) + (L/H) < 2/(1-R_b)$
>
> Where:
>
> W is the room width,
> H is the window head height above floor level
> R_b is the average reflectance of surfaces in the rear half of the room (away from the window).
>
> If L exceeds this value, the rear half of the room will tend to look gloomy and supplementary electric lighting will be required.

2.4.2 A room depth check has been carried out on bedrooms being lit by one window in Units 1 to 6. All rooms achieve the BR 209 recommended room depth.

2.5 Sunlight – Annual Probable Sunlight Hours (APSH) – New Development

2.5.1 BR 209 paragraph 3.1.15 states:

> In general a dwelling, or non-domestic building, which has a particular requirement for sunlight will appear reasonably sunlit provided:
>
> - At least one main window wall faces within 90° of due south and;
> - The centre of at least one window to a main living room can receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21 September and 21 March.

2.5.2 Table 2 provides a record of the assessment of APSH of the windows of the main living rooms facing within 90° of due south from the proposed development. Climate Data[2] from the nearest climate station at Hampton W Wks has been used. Annual probable sunlight hours for Hampton W Wks are 1591 hours and 36 minutes (1591h36m). Therefore, to meet BR 209 numerical target values, windows should receive at least 397h54m (25%) annual probable sunlight hours and 79h35m (5%) annual probable sunlight hours in the winter months.

Table 2: APSH and APSH in the Winter Months

Main Window	APSH	APSH in winter months
Unit 3	282h27m (17.8%)	202h49m (12.7%)
Unit 4	411h39m (25.9%)	158h46m (10.0%)
Unit 6	226h09m (14.2%)	179h22m (11.3%)
Unit 7	331h58m (20.7%)	151h22m (9.5%)
Unit 8	948h35m (59.6%)	329h30m (20.7%)
Unit 9	1018h24m (64.0%)	366h38m (23.0%)

[2] http://www.metoffice.gov.uk/public/weather/climate/gcpsrrk8m

2.6 Sunlight - Gardens – New Development

2.6.1 BR 209 paragraph 3.3.17 states:

> It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March.

2.6.2 60.9% of the proposed garden of The Firs receives at least 2 hours of sunlight on 21 March.

2.7 Skylight – Vertical Sky Component (VSC) – Existing Buildings

2.7.1 BR 209 paragraph 2.2.7 states:

> If the VSC (of the window in an existing building) is greater than 27% then enough skylight should still be reaching the window of the existing building. Any reduction below this level should be kept to a minimum. If the VSC, with the new development in place, is both less than 27% and less than 0.8 times its former value, occupants of the existing building will notice the reduction in the amount of skylight.

2.7.2 Figures 13 to 16 provide a pictorial record of the assessment of the VSC of windows of nearby existing buildings that may be affected by the proposed new development. The boundary between the model and the yellow banding represents a VSC of 27%. All areas with a VSC above 27% are white. All areas with a VSC below 27% are coloured. Lighter colours show areas with a VSC just below 27% and darker colours show areas with a VSC further below 27%.

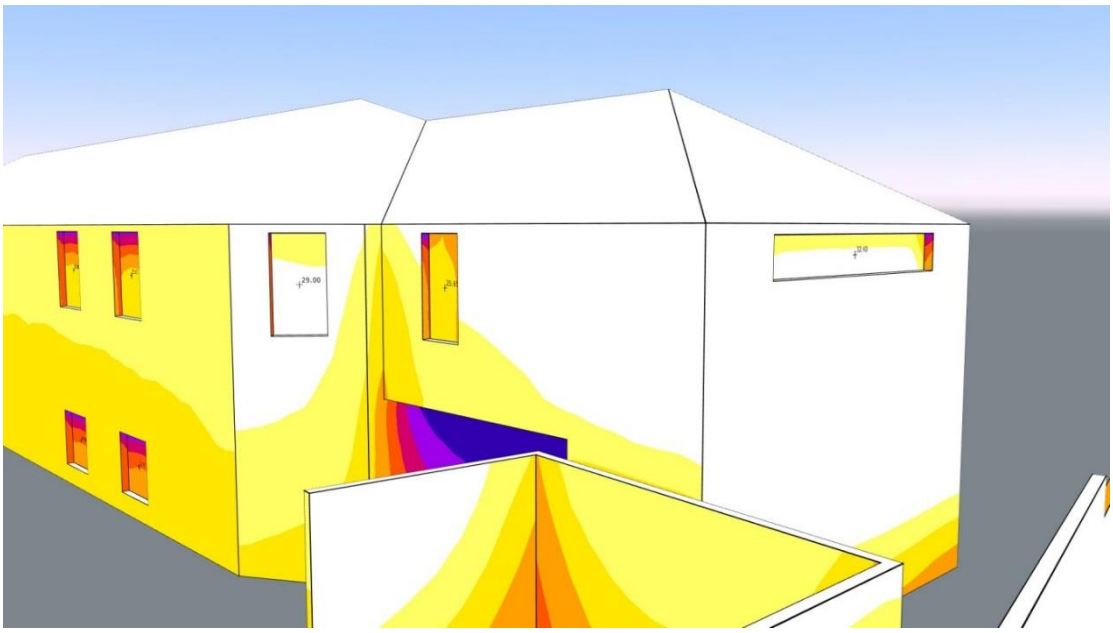

Figure 13 – VSC of South West and South East Elevations of Heron Mews (A) before development

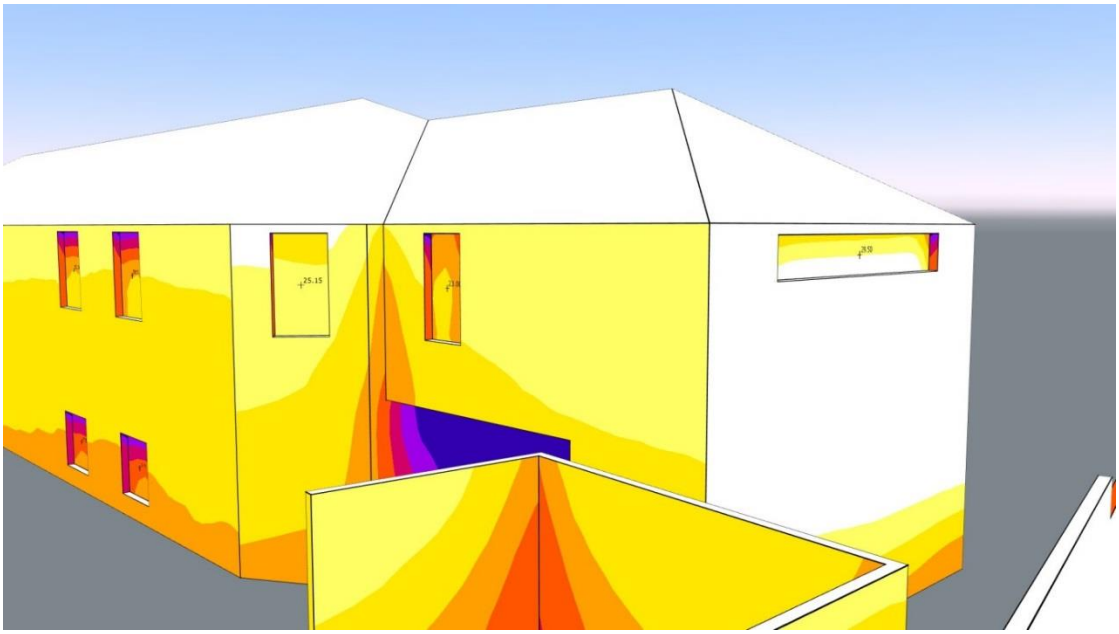

Figure 14 – VSC of South West and South East Elevations of Heron Mews (A) after development

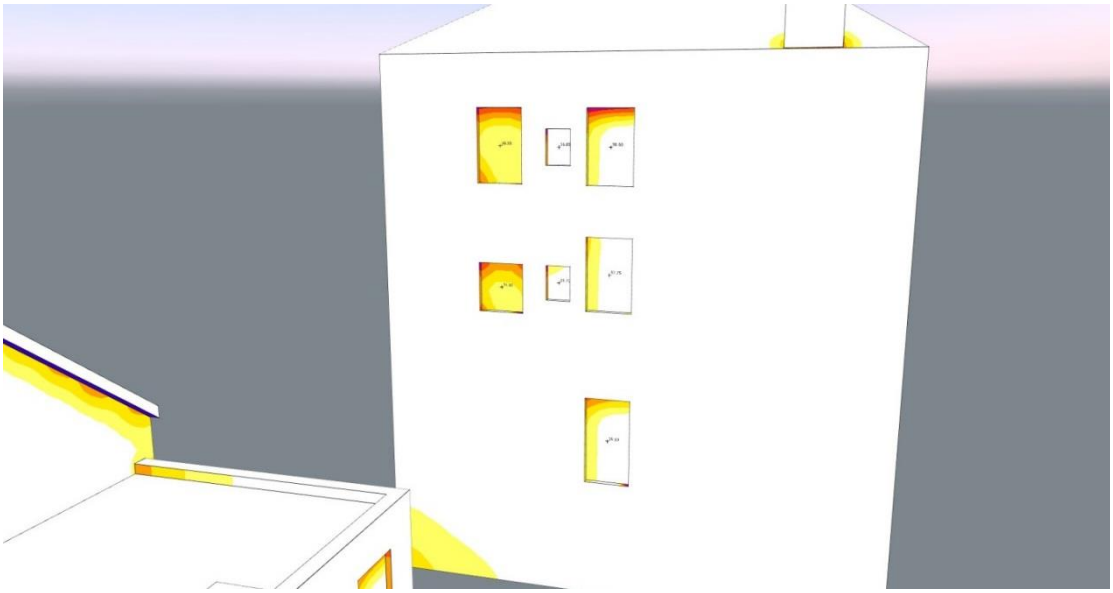

Figure 15 – VSC of North West Elevation of 8 Park View (B) before development

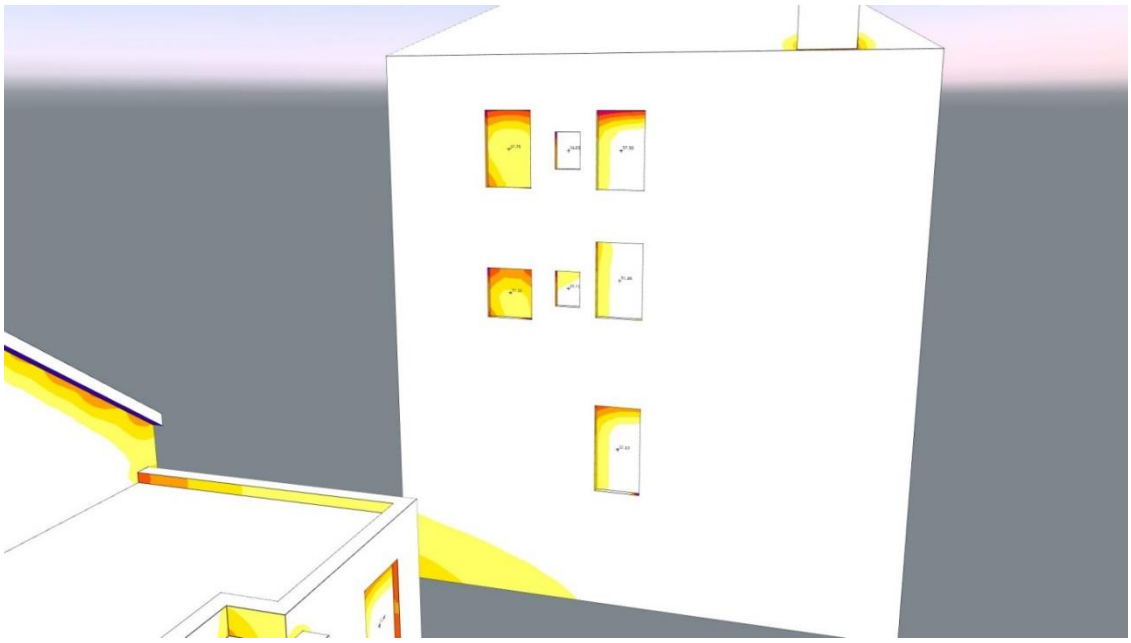

Figure 16 – VSC of North West Elevation of 8 Park View (B) after development

2.7.3 Table 3 provides a numerical record of the assessment of the VSC of windows of nearby existing buildings that may be affected by the proposed new development.

Table 3: VSC – Existing Surrounding Buildings

Window	VSC before development	VSC after development	Fraction of former value
A1	19.30	17.75	0.92
A2	19.70	17.75	0.90
A3	23.55	22.15	0.94
A4	23.60	21.90	0.93
A5	29.00	25.15	0.87
A6	25.65	23.00	0.90
A7	32.40	29.50	0.91
B1	35.10	32.10	0.91
B2	36.80	35.00	0.95
B3	35.70	33.75	0.95
B4	37.75	35.90	0.95
B5	38.55	37.75	0.98
B6	36.85	36.05	0.98
B7	38.60	37.80	0.98

2.8 Sunlight – Annual Probable Sunlight Hours – Existing Buildings

2.8.1 BR 209 paragraph 3.2.11 states;

> If a living room of an existing dwelling has a main window facing within 90° of due south…the sunlighting of the existing dwelling may be adversely affected…if the centre of the window:
>
> - Receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between 21 September and 21 March and;
> - Receives less than 0.8 times its former sunlight hours during either period and;
> - Has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

2.8.2 Table 4 provides a numerical record of the assessment of the annual probable sunlight hours (APSH) and the annual probable sunlight hours in the winter months (WPSH) of windows of nearby existing buildings that may be affected by the proposed new development. Climate Data[3] from the nearest climate station at Hampton W Wks has been used. APSH for Hampton W Wks are 1591 hours and 36 minutes (1591h36m). 25% of APSH are 397 hours 54 minutes (397h54m), 5% of APSH are 79 hours 35 minute (79h35m), and 4% of APSH are 63 hours 40 minutes (63h40m).

[3] http://www.metoffice.gov.uk/public/weather/climate/gcpv7fnqu

Table 4 – APSH and WPSH - Existing Surrounding Buildings

Window	APSH before development	APSH after development	Fraction of former value	WPSH before development	WPSH after development	Fraction of former value	% reduction in sunlight over the whole year (against 1540h24m)	Complies with BR 209 recommendations
A1	481h20m	475h42m	0.99	149h42m	144h04m	0.96	0.35%	✓
A2	490h27m	476h13m	0.97	159h12m	144h58m	0.91	0.89%	✓
A3	587h55m	587h55m	1.00	166h22m	166h22m	1.00	0.00%	✓
A4	587h45m	587h45m	1.00	175h38m	175h38m	1.00	0.00%	✓
A5	883h13m	877h23m	0.99	323h26m	317h37m	0.98	0.36%	✓
A6	632h00m	620h08m	0.98	203h51m	191h59m	0.94	0.75%	✓
A7	971h27m	946h23m	0.97	403h23m	378h20m	0.94	1.58%	✓

3 Conclusions

3.1.1 An assessment of the skylight and sunlight levels of the 9 proposed dwellings and the impact that the proposed development may have on the skylight and sunlight of the existing surrounding buildings, has been undertaken in accordance with guidance set out in *BRE report 209, Site Layout Planning for Daylight and Sunlight: A guide to good practice, Second Edition, 2011 (BR 209), and BS 8206-2 Code of Practice for Daylighting.*

3.1.2 Whilst BR 209 gives numerical guidelines for assessing skylight and sunlight levels, it is important to bear in mind that the guidance is predicated on a suburban model of development and that the numerical guidelines should be interpreted flexibly. BR 209 Paragraph 1.6 states:

> The guide (BR 209) 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 taken 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.

3.1.3 The need for flexibility is of particular relevance in London due to the high density of development and tight proximity of buildings. This has been recognised in the London Housing Supplementary Planning Guidance (March 2016) which states that '*an appropriate degree of flexibility needs to be applied when using BRE guidelines to assess the daylight and sunlight impacts of new development on surrounding properties, as well as within new developments themselves.'*

3.1.4 With this in mind, the following conclusions have been drawn:

1) All of the habitable rooms of the proposed dwellings exceed the skylight levels recommended in BR 209 and BS 8206-2.

2) Of the six proposed new dwellings that have a living room window that faces within 90° of due south, three achieve the recommended annual probable sunlight hours (APSH) and the recommended annual probable sunlight hours in the winter months (WPSH). The three living rooms that fall below the recommended APSH do so because of the presence of balconies. The balconies are proposed to provide the residents with private amenity space. They also provide the additional benefit of reducing overheating risk in the summer.

3) The proposed communal garden achieves the sunlight levels recommended in BR 209.

4) The proposed development would have an imperceptible impact on the daylight levels of all surrounding existing windows assessed.

5) The proposed development would have an imperceptible impact on the sunlight levels of all surrounding existing windows.