

75-77 London St, Reading RG1 4QA

Daylight & Sunlight Assessment

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The Keen Partnership



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This document has been prepared by:  Chris Collier, Consulting Engineer BSc Mec Eng MIET			

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1 Introduction

This report details a Daylight & Sunlight Assessment for the proposed new development at 75-77 London St, Reading RG1 4QA. The existing site occupies a developed portion of land between London Street and East Street, and is surrounded by neighbouring residential properties to the north and to the west, as indicated in the aerial image below.

The existing property comprises a listed 3-storey building on the London Street frontage, with a large hall to the rear occupying most of the site.

The proposed development comprises demolition of the hall and redevelopment of the rear of the site, to provide a 2no. 3-storey apartment blocks (6no. flats per block) and a ground floor rear extension to the front listed building, comprising 3no. residential units.

The purpose of this report is to perform a daylight and sunlight assessment for the habitable rooms of the surrounding properties, and to compare with guidance provided by the BRE (BR209: Site Layout Planning for Daylight and Sunlight 2011) along with BS 8206-2 'Code of practice for Daylighting' and CIBSE Guide LG10 – Daylighting and Window Design.



Figure 1: Aerial View: Existing site & surrounding properties (source: Google Earth)

2 Executive Summary

2.1 Daylight & Sunlight Analysis of Surrounding Properties

There are two components of natural light which need to be considered when assessing the impact of a proposed development on the surrounding properties, being the level of daylight and the annual sunlight hours. Both are given as a percentage/proportion of a theoretical maximum, with limits set by the BRE giving guidance on acceptable levels.

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

In terms of Annual Probable Sunlight Hours (APSH), the assessed windows which face within 90° of due south, have been shown to pass the APSH test according to the BRE.

It has been demonstrated that the values of daylight levels and annual sunlight hours are thus considered to be acceptable for all surrounding properties.

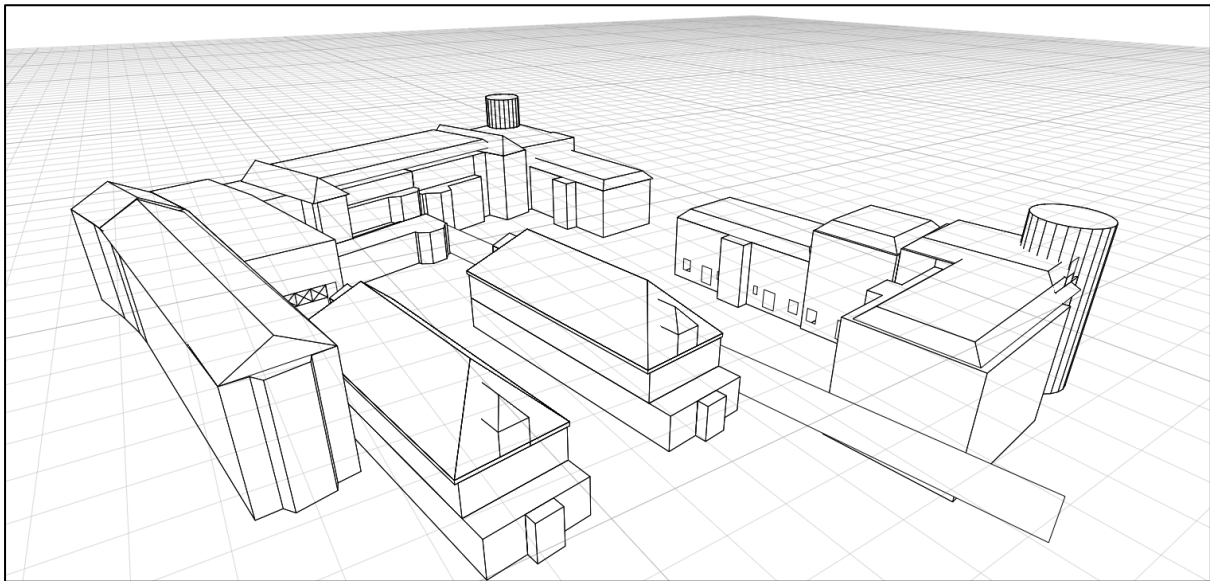


Figure 2: 3D Daylight Model: Proposed development (view from east)

3 Discussion

The introduction to the BRE document 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice' states the following:

'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. In special circumstances the developer or Planning Authority may wish to use different target values.'

With this in mind, the assessment has been carried out to assess the impact of the development on daylight and sunlight levels to neighbouring residential properties.

3.1 Measurement of Daylight

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.

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. Average Daylight Factor (ADF)

The second and third methods (NSC and ADF) require knowledge of the internal layout of the property being assessed, whilst the first method is determined solely on the external skyline obstructions. In this instance the neighbouring properties have been assessed primarily based on the first method (VSC), whilst reasonable assumptions can be made with regards to internal geometry and surface finishes, in order to assess the NSC and ADF.

The VSC methodology is defined as:

'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'.

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:

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

3.2 Measurement of Sunlight

The sunlight to a given window can be quantified using the Annual Probable Sunlight Hours (APSH) method. The unobstructed total in London 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 hrs. Each spot which is uncovered by an obstruction can thus be counted to provide ~1% of total APSH.

Alternatively, an approved simulation software tool (such as the SunCast package within the IES Virtual Environment) can be used to undertake the analysis.

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

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.

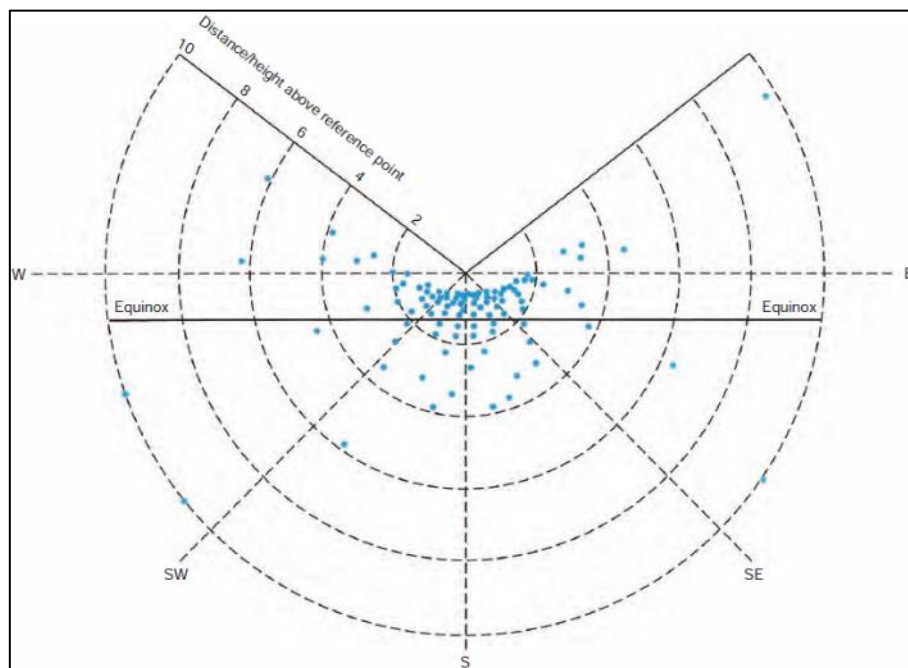


Figure 3: BRE Sunlight Availability Indicator - London

4.1 79 London Street

The 3D model of 79 London Street is shown below (W01-W04); the building is located to the west of the proposed development. The property consists of a 3-storey office/residential building, with the assessed 1st floor windows (facing the proposed building) assumed to serve habitable spaces (the ground floor rear does not currently have an outlook due to the existing hall):

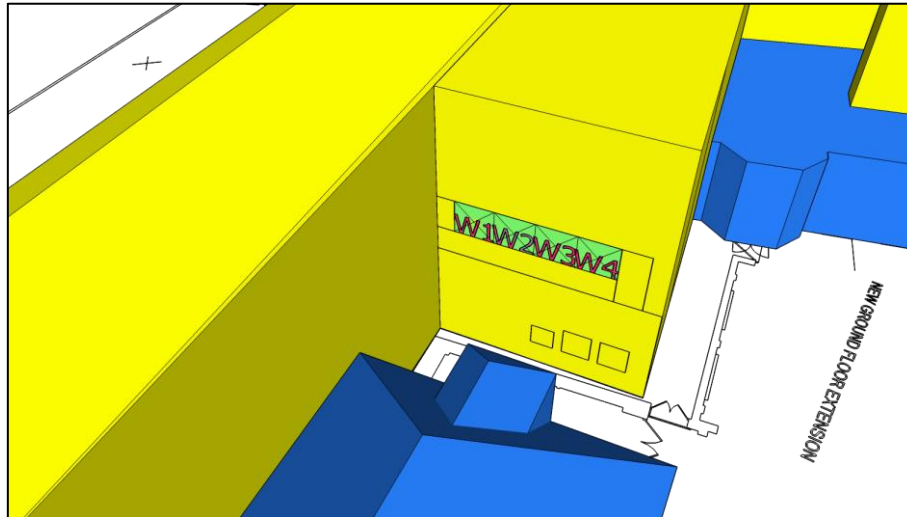


Figure 5: 3D Model – 79 London Street (W1-W4)

4.1.1 Results of Daylight Analysis

A Vertical Sky Component (VSC) assessment criteria of 27% is usually adopted, however the BRE advises that these values are: ‘..purely advisory and different targets may be used based on the special requirements of the proposed development or its location.’

The results of the daylight assessment indicate that the assessed windows would retain a VSC above 27% or within 0.8 times their former value following the proposed development, thus the reduction in daylight levels would not be noticeable according to the BRE guidance.

Window Map ID	Address/Zone	Existing VSC (%)	Proposed VSC (%)	Ratio	Notes:
W1	79 London Street (1F Rear)	22.17	20.02	0.90	Reduction of 9.7%
W2	79 London Street (1F Rear)	25.95	23.27	0.90	Reduction of 10.4%
W3	79 London Street (1F Rear)	28.68	25.79	0.90	Reduction of 10.1%
W4	79 London Street (1F Rear)	30.55	27.71	0.91	Reduction of 9.3%

4.1.2 Results of Sunlight Analysis

The assessed windows do not face within 90 degrees of due south, therefore sunlight analysis is not necessary according to the BRE.

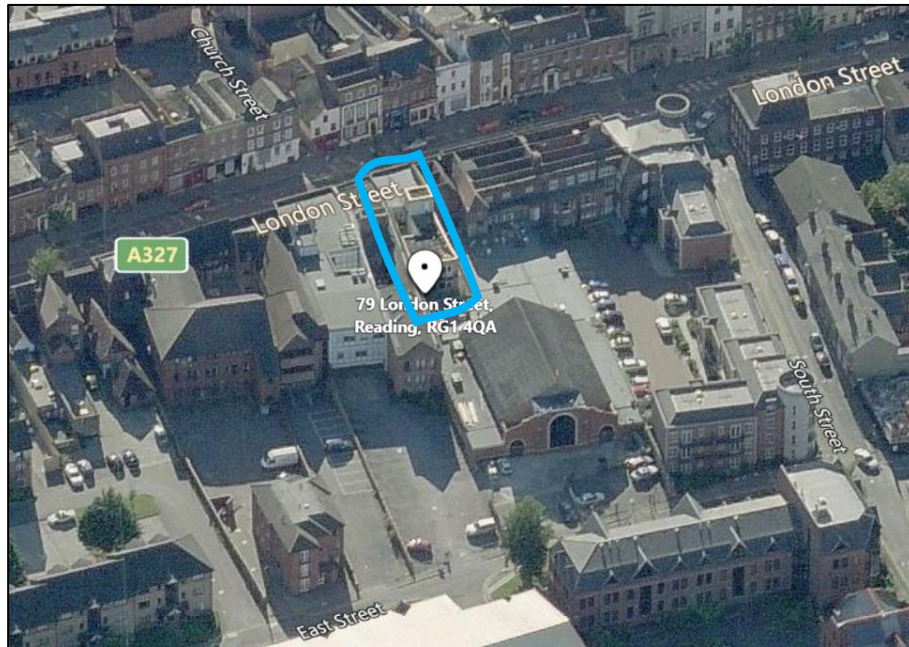


Figure 6: View from east – 79 London Street (source: Bing Maps)

4.2 73 London Street

The 3D model of 73 London Street is shown below; the building is located to the north-west of the proposed development. The property consists of a 3-storey office building, with rear windows facing the proposed development.

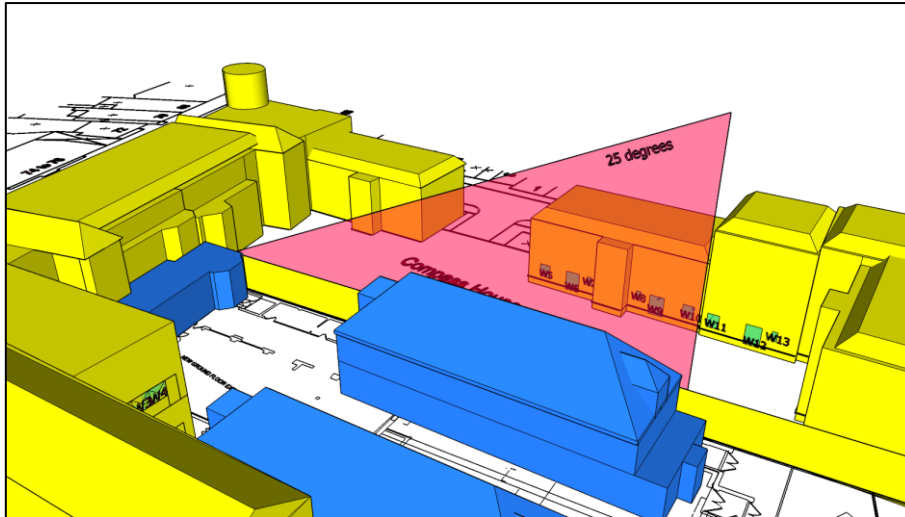


Figure 7: 3D Model – 73 London Street

4.2.1 Results of Daylight Analysis

The proposed development falls wholly beneath a 25° angle taken from the centre of the lowest windows at 73 London Street, therefore the development will not cause a significant reduction in the skylight received by the window and no further analysis is necessary.

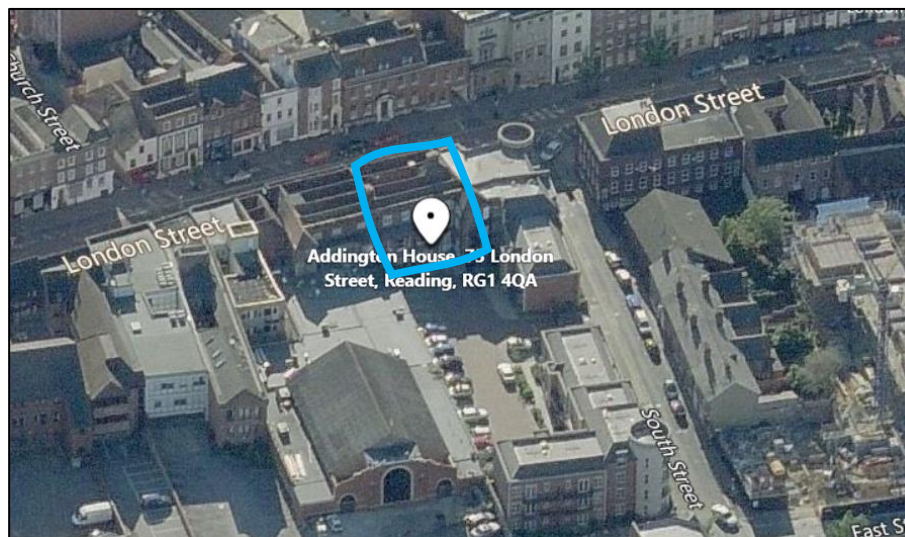


Figure 8: View from east – 73 London Street (source: Bing Maps)

4.3 Compass House, 67 London Street (units 19 to 30)

The 3D model of Compass House, 67 London Street (units 19 to 30) is shown below; the building is located to the north-west of the proposed development. The property consists of a part 2-storey, part 3-storey residential building, with windows facing the proposed development. A reference point 1.6m above ground level has been analysed according to the BRE guidance:

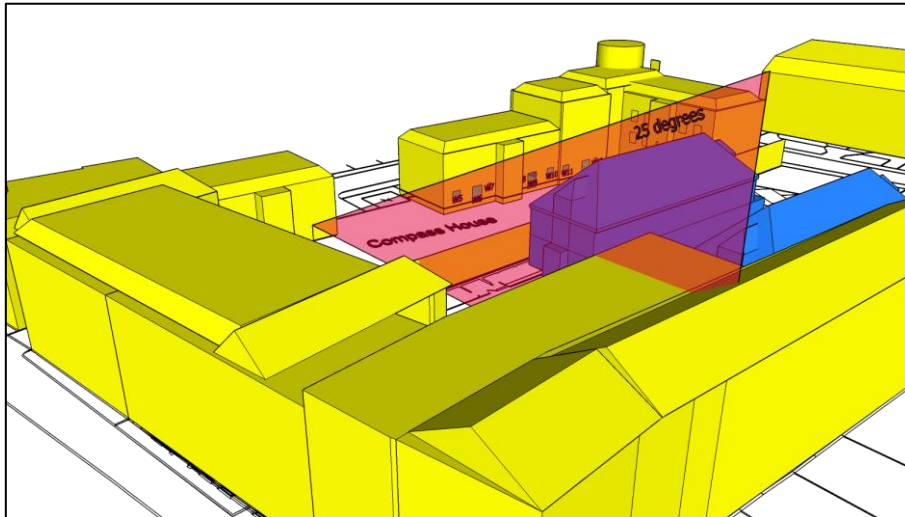


Figure 9: 3D Model – Compass House, 67 London Street (units 19 to 30)

4.3.1 Results of Daylight Analysis

The proposed development falls wholly beneath a 25° angle taken from the centre of the lowest windows at 67 London Street (units 19 to 30), therefore the development will not cause a significant reduction in the skylight received by the window and no further analysis is necessary.



Figure 10: View from east – Compass House, 67 London Street (units 19 to 30) (source: Bing Maps)

4.4 Compass House, 67 London Street (units 1 to 18)

The 3D model of Compass House, 67 London Street (units 1 to 18) is shown below; the building is located to the north of the proposed development. The property consists of a part 2-storey, part 3-storey residential building, with windows facing the proposed development. The lowest level of the residential building (ground floor) has been analysed according to the BRE guidance:

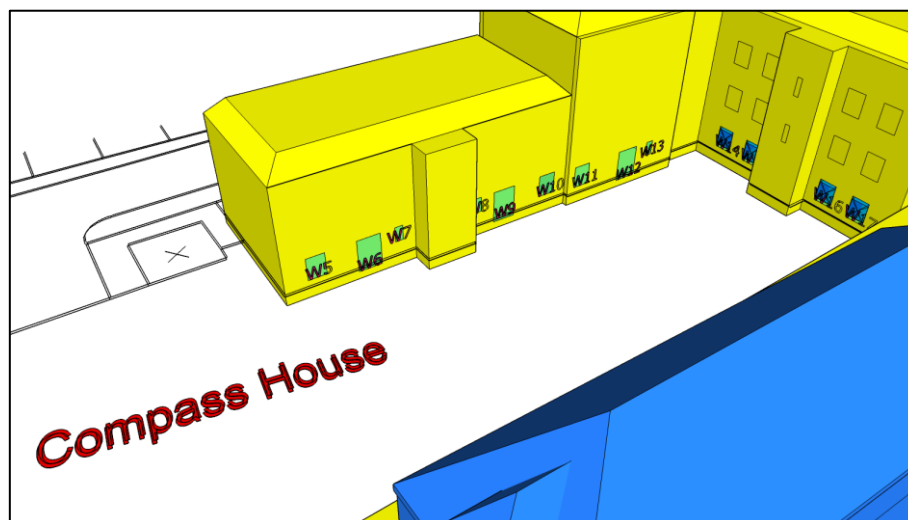


Figure 11: 3D Model – Compass House, 67 London Street (units 1 to 18)

4.4.1 Results of Daylight Analysis

A Vertical Sky Component (VSC) assessment criteria of 27% is usually adopted, however the BRE advises that these values are: ‘..purely advisory and different targets may be used based on the special requirements of the proposed development or its location.’

The results of the daylight assessment indicate that the assessed windows would retain a VSC above 27% or within 0.8 times their former value following the proposed development, thus the reduction in daylight levels would not be noticeable according to the BRE guidance.

Window Map ID	Address/Zone	Existing VSC (%)	Proposed VSC (%)	Ratio	Notes:
W5	67 London Street (units 1-18)	31.39	29.32	0.93	Reduction of 6.6%
W6	67 London Street (units 1-18)	30.05	27.73	0.92	Reduction of 7.7%
W7	67 London Street (units 1-18)	25.56	23.27	0.91	Reduction of 8.9%
W8	67 London Street (units 1-18)	24.49	22.55	0.92	Reduction of 7.9%
W9	67 London Street (units 1-18)	28.77	26.78	0.93	Reduction of 6.9%
W10	67 London Street (units 1-18)	29.33	27.83	0.95	Reduction of 5.1%
W11	67 London Street (units 1-18)	28.71	27.52	0.96	Reduction of 4.1%
W12	67 London Street (units 1-18)	25.60	24.84	0.97	Reduction of 3%

W13	67 London Street (units 1-18)	24.17	23.77	0.98	Reduction of 1.6%
W14	67 London Street (units 1-18)	19.13	18.25	0.95	Reduction of 4.6%
W15	67 London Street (units 1-18)	19.15	18.54	0.97	Reduction of 3.2%
W16	67 London Street (units 1-18)	26.23	24.91	0.95	Reduction of 5%
W17	67 London Street (units 1-18)	26.75	26.25	0.98	Reduction of 1.8%

4.4.2 Results of Sunlight Analysis

The assessed windows which face within 90° of due south (W5-W13), have required sunlight analysis to be undertaken based on the annual probable sunlight hours (APSH) test.

The BRE guidance states that if a room has multiple windows on the same wall or on adjacent walls, the highest value of APSH should be taken. The BRE recommends that the main window of a main living room should receive 25% of APSH including at least 5% of APSH in winter.

The sunlighting of an existing dwelling may be adversely affected if the centre of the window:

1. receives less than 25% of APSH, or less than 5% of APSH between 21 September and 21 March,
And,
2. receives less than 0.8 times its former sunlight hours during either period,
And,
3. has a reduction in sunlight received over the whole year greater than 4% of APSH.

The analysis has been undertaken according to the APSH methodology, for the lowest windows which may serve living rooms (windows which serve toilets, stairs, bedrooms and kitchens have been excluded from the analysis according to BRE guidance).

Existing APSH

Win ID	Room Name	Orien-tation(°)	Annual (%)	Summer (%)	Winter (%)	Annual Result	Winter Result
W05	67 London Street (units 1-18)	172.31	60.05	37.53	22.53	Pass	Pass
W06	67 London Street (units 1-18)	172.31	56.19	34.30	21.89	Pass	Pass
W07	67 London Street (units 1-18)	172.31	46.57	26.93	19.64	Pass	Pass
W08	67 London Street (units 1-18)	172.63	41.19	24.57	16.62	Pass	Pass
W09	67 London Street (units 1-18)	172.63	47.25	28.36	18.89	Pass	Pass
W10	67 London Street (units 1-18)	172.63	51.08	31.37	19.71	Pass	Pass
W11	67 London Street (units 1-18)	172.29	50.66	31.79	18.88	Pass	Pass
W12	67 London Street (units 1-18)	172.29	45.46	28.84	16.62	Pass	Pass
W13	67 London Street (units 1-18)	172.29	43.06	26.27	16.79	Pass	Pass

Proposed APSH

Win ID	Room Name	Orien-tation(°)	Annual (%)	Summer (%)	Winter (%)	Annual Result	Winter Result
W05	67 London Street (units 1-18)	172.31	56.11	37.53	18.58	Pass	Pass
W06	67 London Street (units 1-18)	172.31	51.37	34.30	17.06	Pass	Pass
W07	67 London Street (units 1-18)	172.31	41.95	26.93	15.02	Pass	Pass
W08	67 London Street (units 1-18)	172.63	36.97	24.57	12.41	Pass	Pass
W09	67 London Street (units 1-18)	172.63	43.65	28.36	15.29	Pass	Pass
W10	67 London Street (units 1-18)	172.63	48.62	31.37	17.25	Pass	Pass
W11	67 London Street (units 1-18)	172.29	48.90	31.79	17.12	Pass	Pass
W12	67 London Street (units 1-18)	172.29	44.11	28.84	15.27	Pass	Pass
W13	67 London Street (units 1-18)	172.29	42.09	26.27	15.81	Pass	Pass

The ground floor south-facing windows have been tested for APSH. The BRE guidance states that the higher APSH value for windows on the same wall or adjacent walls should be considered, whilst APSH values for windows on opposite walls can be added.

The proposed APSH for the windows all meet the requirement to receive 25% of APSH including at least 5% of APSH in winter.

The results of the sunlight analysis indicate that the assessed windows have been shown to pass the APSH test. Thus, the reduction in sunlight levels is not likely to be noticeable, according to the BRE guidance.

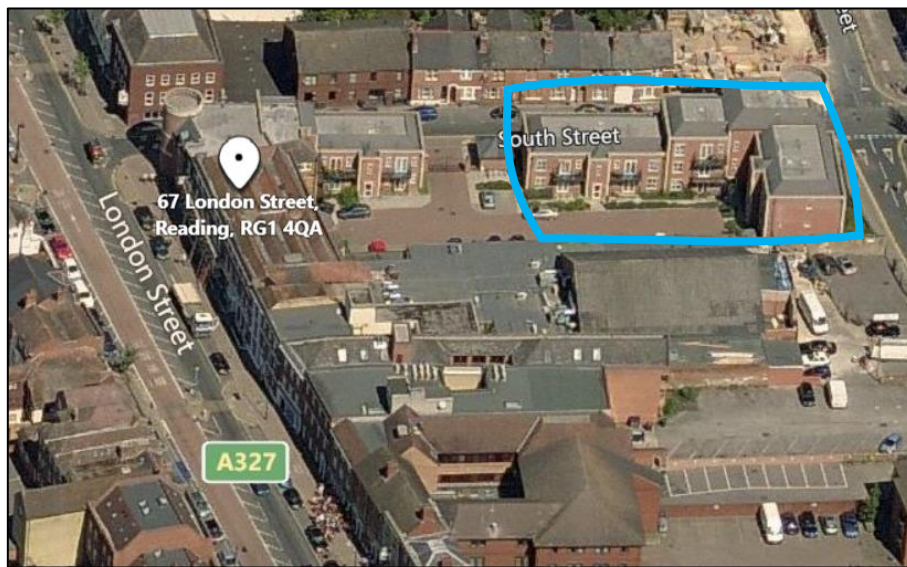


Figure 12: View from east – Compass House, 67 London Street (units 1 to 18) (source: Bing Maps)

5 Conclusion

5.1 Daylight & Sunlight Analysis of Surrounding Properties

There are two components of natural light which need to be considered when assessing the impact of a proposed development on the surrounding properties, being the level of daylight and the annual sunlight hours. Both are given as a percentage/proportion of a theoretical maximum, with limits set by the BRE giving guidance on acceptable levels.

In terms of daylight levels to a window, the BRE has set a guideline for a Vertical Sky Component (VSC) of 27%, or a reduction of not worse than 0.8 times the former level. The 27% figure relates to low-density suburban housing. The BRE advises that in inner city locations lower values can be acceptable.

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

In terms of Annual Probable Sunlight Hours (APSH), the assessed windows which face within 90° of due south, have been shown to pass the APSH test according to the BRE.

It has been demonstrated that the values of daylight levels and annual sunlight hours are thus considered to be acceptable for all surrounding properties.