

Internal Daylight assessment

118 Stapleton Hall Road, London, N4 4QA

Prepared on behalf of:
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Executive Summary

Build Energy Ltd. were appointed by Steven Adams Architects Ltd to prepare an Internal Daylight Assessment (IDA) in order to examine the levels of daylight received on habitable rooms on lower and ground floors only regarding 118 Stapleton Hall Road, London, N4 4QA.

The following can be concluded based on the studies undertaken:

- Internal daylight (IDA): All examined habitable rooms are compliant with the minimum standards set out by BRE by achieving excellent levels of internal daylight distribution.

Therefore, all examined habitable rooms are compliant with the minimum internal daylight standards outlined in the (BRE) Guide 'Site Layout Planning for Sunlight and Daylight: A Guide to Good Practice' by P J Littlefair (2022) and the overall the scheme is compliant.

Introduction

Build Energy Ltd. were appointed by Steven Adams Architects Limited to prepare an Internal Daylight Assessment (IDA) in order to examine the levels of daylight received on habitable rooms on lower and ground floors only regarding 118 Stapleton Hall Road, London, N4 4QA.

The Building Research Establishment (BRE) sets out good practice daylight and sunlight guidance in BRE “*Site Layout Planning for Daylight and Sunlight 2022*” guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings. This document states that it is also intended to be used in conjunction with the interior daylight recommendations found within the British Standard BS8206-2:2008 and the *Applications Manual on Window Design* of the Chartered Institution of Buildings Services Engineers (CIBSE).

Internal Daylight calculations have been carried out in accordance with BRE new guidance.

Nature effect of Daylight

The provision of daylight is as important as ensuring low levels of noise or low levels of odour in maintaining the enjoyment of one’s property. Adequate levels of daylight are important not only to light and heat the home, but also for an occupant’s emotional well-being.

Daylight is widely accepted to have a positive psychological effect on human beings and there is a great deal of evidence to suggest that people who are deprived of daylight are more susceptible to depression and mood swings. This is common in northern countries, such as Norway, Iceland, and Canada where daylight is scarce during the winter months.

Daylight/Sunlight Simulation model

We have proposed the following methodology in order to examine all required parameters:

- Prepare 3D visualization models using Sketch Up to understand and visualize the examined scenario, Rhino/Grasshopper and Ladybug plugin tools.
- Carry out an internal daylight assessment using the methodologies set out in by BRE and British Standard Guidelines.

Description of the development

The assessment examines only the lower ground and the ground floor habitable rooms as per image below.

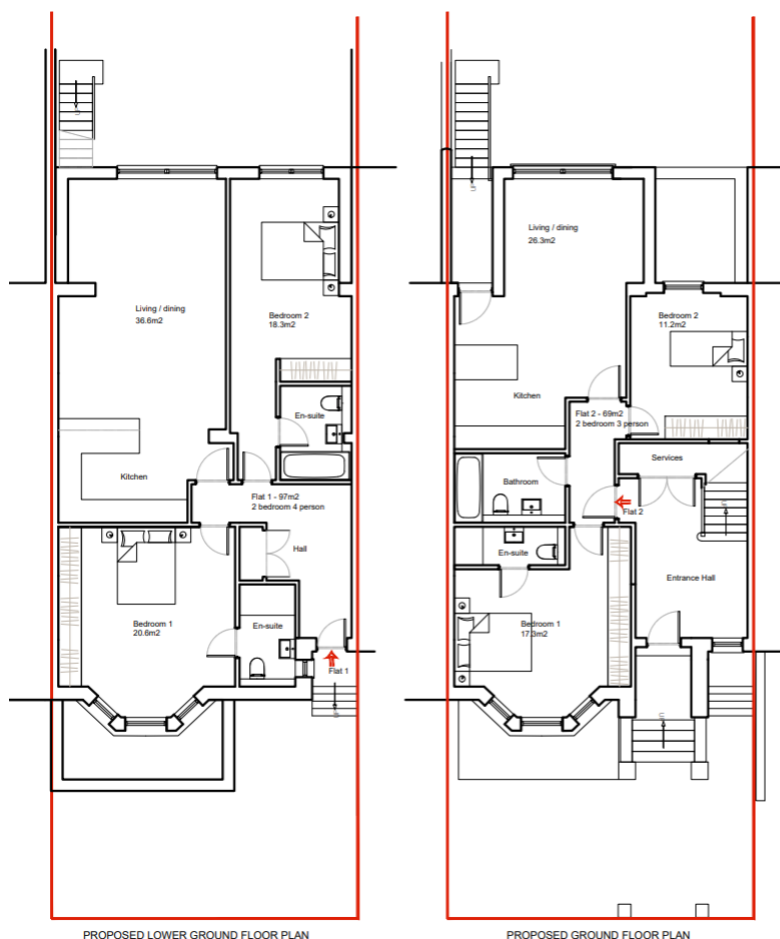


Image 1 : Proposed lower ground and ground floors

Policy

This study is based on guidelines set out in the *BRE Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice, 2022*.

The assessment has been conducted using Radiance software through the GUI of Ladybug and Honeybee tool plugins in Rhino/Grasshopper. A 3D model has been built based on the latest architectural drawings.

The simulations assess the Annual Illuminance Target (ET), DA and sDA. Key points of the simulation include:

- Tested on a horizontal plane at 0.85 m above the floor
- Grid size of 0.25m
- Margin of 0.30m from the internal walls
- Hourly weather file for a whole year from London TRY2016
- Reflectances:
 - internal walls: 60%
 - Internal Ceiling: 70%
 - Internal Floors: 35%
 - External Walls: 40%
 - Ext. Floor outside lower level bedroom: 60%
 - Ground: 20%
 - Frame: 35%
 - Glass: 65% Visible Light Transmittance

If a property is considered to have a reasonable expectation of daylight or sunlight the following methodology to assess the impacts has been used.

Internal Daylight Assessment

British Standard “Daylight in buildings” (BS EN 17037)

The British Standard “Daylight in buildings” (BS EN 17037) contains advice and guidance on interior daylighting. The guidance contained in the BRE publication (BR 209, 2022) is intended to be used with BS EN 17037 and its UK National Annex.

BS EN 17037 supersedes BS 8206 Part 2 “Code of practice for daylighting”[C2], which contained a method of assessment based on Average Daylight Factor, which is now no longer recommended. For daylight provision in buildings, BS EN 17037 provides a methodology based on target illuminances from daylight to be achieved over specified fractions of the reference plane for at least half of the daylight hours in a typical year.

BS EN 17037 gives three levels of recommendation for daylight provision in interior spaces: minimum, medium and high. For compliance with the standard, a daylit space should achieve the minimum level of recommendation

The National Annex A of BS EN 17037 also gives minimum values for housing, in living rooms, kitchens, and bedrooms. Achieving higher daylight factor values will give improved daylight provision. This would be particularly appropriate in housing for the elderly because they require more light and are more likely to be at home during the day.

However, interiors with very high daylight levels (for example where a daylight illuminance of 500 lux is exceeded over half the room for more than half of the daylight hours) sometimes have problems with summertime overheating or excessive heat loss in winter.

Annual Daylight Metrics

The annual daylight method involves using climatic data for the location of the site (via the use of an appropriate, typical or average year, weather file) to calculate the illuminance from daylight at each point on an assessment grid on the reference plane at an at least hourly interval for a typical year.

A target illuminance (ET) is the illuminance from daylight that should be achieved for at least half of annual daylight hours across a specified fraction of the reference plane in a daylit space.

Daylight Autonomy (DA) is the percentage of occupied hours that each sensor receives more than the illuminance threshold, and Spatial Daylight Autonomy (sDA) is an annual daylighting metric that quantifies the fraction of the area within a space for which the daylight autonomy exceeds a specified value.

Specific recommendations for daylight provision in UK dwellings

The UK National Annex gives specific minimum recommendations for habitable rooms in dwellings in the United Kingdom. These are intended for 'hard to light' dwellings, for example in basements or with significant external obstructions or with tall trees outside, or for existing buildings being refurbished or converted into dwellings. The National Annex, therefore, provides the UK guidance on minimum daylight provision in all UK dwellings.

The UK National Annex gives illuminance recommendations of:

- 100 lux in bedrooms,
- 150 lux in living rooms and
- 200 lux in kitchens.

These are the median illuminances, to be exceeded over at least 50% of the assessment points in the room for at least half of the daylight hours.

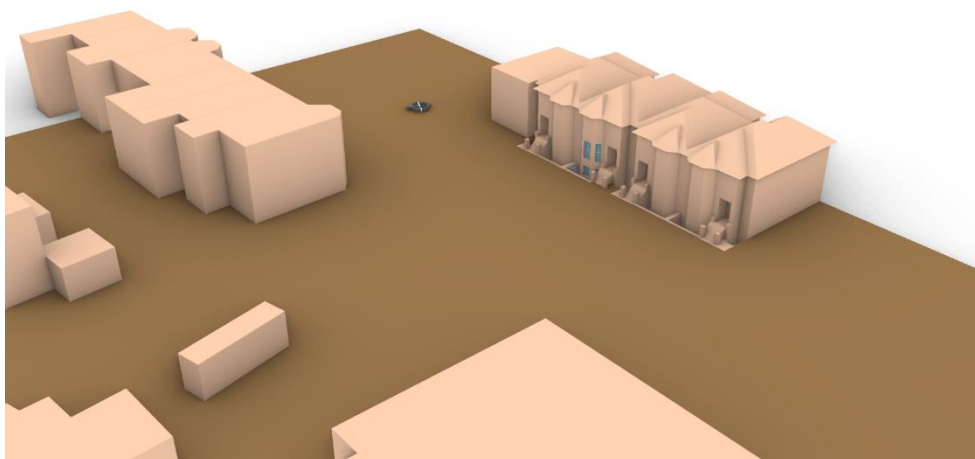


Image 2 –3D model representation

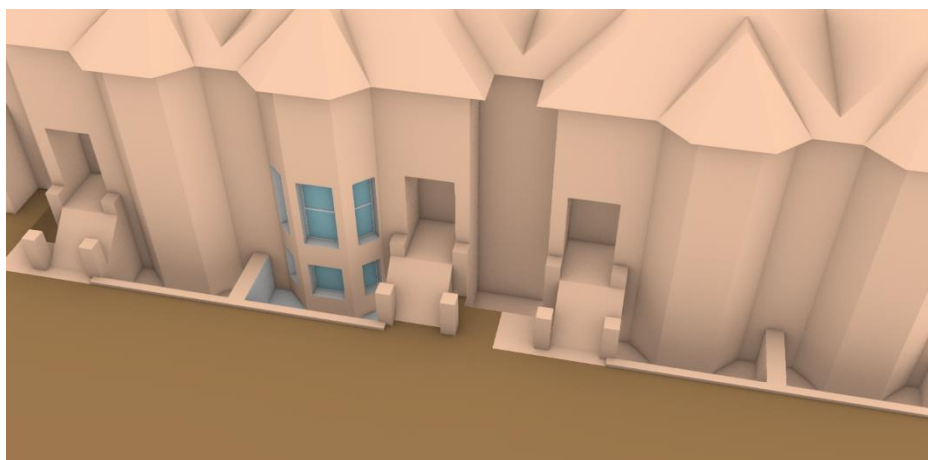


Image 3 –3D model representation

Results

Annual Daylight Metrics

The annual daylight method involves using climatic data for the location of the site (via the use of an appropriate, typical or average year, weather file) to calculate the illuminance from daylight at each point on an assessment grid on the reference plane at an at least hourly interval for a typical year.

A target illuminance (ET) is the Illuminance from daylight that should be achieved for at least half of annual daylight hours across a specified fraction of the reference plane in a daylit space.

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Internal Daylight Analysis - IDA - 41 Eton Wick Road				
Flat Number	Space name	SDA Target	SDA Achieved	Compliance
			65.72	
Lower Ground Floor	Bedroom	100lux >50%	82.88	PASS
Ground Floor	Bedroom	100lux >50%	100	PASS

Table 1 – Internal Daylight Assessment /sDA results

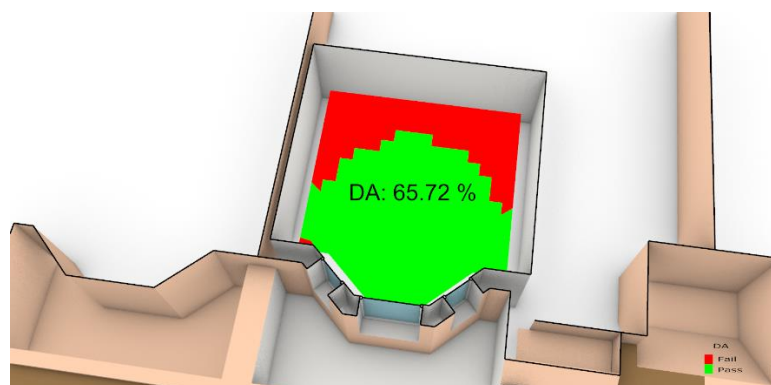


Image 4 – sDA analysis results / Pass or Fail sensors / Lower Ground Floor

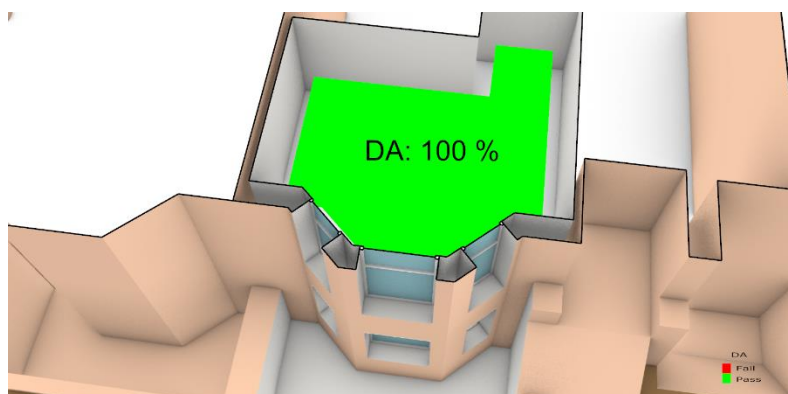


Image 5 – sDA analysis results / Pass or Fail sensors / Ground Floor

Conclusions

Build Energy Ltd. were appointed by Steven Adams Architects Ltd to prepare an Internal Daylight Assessment (sDA) in order to examine the levels of daylight received on habitable rooms on lower and ground floors only regarding 118 Stapleton Hall Road, London, N4 4QA.

The report assesses the internal daylight effect on the proposed dwellings. The assessment is undertaken in accordance with **"BRE 209 Digest: Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice"**.

The following can be concluded based on the studies undertaken:

- Internal daylight (sDA): All examined habitable rooms compliant with the minimum standards set out by BRE by achieving excellent levels of internal daylight distribution.

Therefore, all examined habitable rooms are compliant with the minimum internal daylight standards outlined in the (BRE) Guide 'Site Layout Planning for Sunlight and Daylight: A Guide to Good Practice' by P J Littlefair (2022) and the overall the scheme is compliant.