



Unlocking potential for a better built environment

DAYLIGHT & SUNLIGHT

INTERNAL ASSESSMENT

Montague Quarter Shopping Centre, Worthing

Cayuga Developments Limited

11 July 2025

GIA No: **18335**

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Client **Cayuga Developments Limited**
Architect **Lomax Architecture**
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1 SUMMARY OF CONCLUSIONS

The purpose of this report is to ascertain whether the proposed residential units on first floor level within the northern portion of the Montague Quarter Shopping Centre, Worthing, will provide acceptable daylight and sunlight amenity to future residents.

The assessments are based on BRE guidance 'Site Layout Planning for Daylight and Sunlight a Guide to Good Practice (2022)' and the BS EN 17037. Given the nature of the scheme and its town centre location, the relevant targets considered are those set out in the UK National Annex to BS EN 17037.

The overviews in Section 4 of this report depict the portion of the building that has been assessed.

For daylight, all habitable rooms within the proposed nine dwellings have been assessed for Median Daylight Illuminance (MDI), which sets illuminance targets (measured in lux) to be achieved for over 50% of each room for more than half of the daylight hours in the year.

For sunlight, all rooms have been tested for orientation and solar exposure on 21 March. Results are then interrogated per unit.

For daylight, 18 out of the 22 proposed habitable rooms would exceed guidelines, providing excellent levels of light. This figure considers the higher recommendation of 200lux for combined Living/Kitchen/Dining spaces (LKDs).

Of the rooms falling short of recommendation, one is a bedroom seeing only a marginal shortfall of 4lux from guidelines, and so this is also considered well daylight. The remaining three rooms are LKDs. These rooms are generously sized, a feature which serves to lower the MDI figure across these rooms overall, however occupants will benefit from a larger space. The internal layouts of these rooms have been optimised to locate the living space closer to the windows, where they would see higher levels of light.

For sunlight, six of the nine proposed dwellings would have a south-facing window and would meet the recommendation of at least one and half hours of sunlight on 21st March.

The three units not achieving recommendation are north-east or north-west facing, and so inherently have lower sunlight exposure due to their orientation. One of these units is dual aspect, and all of them have daylight levels above recommendation in all their rooms. As such, these units are still considered to provide acceptable natural light amenity overall despite sunlight levels being below guidelines.

In conclusion, the results of the assessments have shown very good levels of daylight and sunlight in the vast majority of the proposed flats. In the very few areas where lower levels of light are available, the design has sought to prioritise natural light in living spaces, and has provided generous layouts. As a result, all residents will be able to enjoy excellent or acceptable levels of light.

2 BRE GUIDELINES

The Building Research Establishment (BRE) have set out in their handbook 'Site Layout Planning for Daylight and Sunlight a Guide to Good Practice (BR 209 2022)', guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings.

2.1 INTRODUCTION

The BRE published the latest edition of 'Site layout planning for daylight and sunlight: a guide to good practice' in June 2022 (BR 209). This is to be read in conjunction with BS EN 17037:2018 "Daylight in buildings", the UK National Annex of the British Standard and the CIBSE publication LG 10 'Daylighting – a guide for designers'.

BR 209 contains methodologies for appraising the daylight and sunlight quality within new developments. Nonetheless, the main aim of the guidance is maintained: *"to help rather than constrain the designer"* as stated in Paragraph 1.5 of the new guidance.

The report provides advice, but also clearly states that it *"is not mandatory and the guide should not be seen as an instrument of planning policy."* The guidance also acknowledges in its introduction that *"Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design (see Section 5). 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."* (Paragraph 1.6)

2.2 BS EN 17037:2018 AND THE UK ANNEX

The latest European Standard on daylight is BS EN 17037:2018 "Daylight in buildings". Following a review of this by a dedicated commission of UK experts, however, the British Standard Institution appended a UK National Annex which noted that the new recommendations "may not be achievable for some buildings, particularly dwellings" and specifically mentions dwellings in a dense urban area or with tall trees outside. The annex goes on to suggest lower recommended light levels for dwellings, in line with those of the previous version of the British Standard, BS8206-2:2008.

BS EN 17037 includes four criteria: daylighting, views, sunlight access and glare. Daylighting and sunlight access are considered relevant for residential buildings and therefore discussed within this report.

View out and Glare are not solely but mostly relevant in offices and schools, where occupants are more fixed to a certain location within a room. In residential habitable rooms, occupants tend to move more freely and therefore view out and glare are not assessed within residential buildings.

In relation to sunlight access, BS EN 17037:2018 suggests that the hours of sunlight reaching a window is considered "on a selected date between February 1st and March 21st". BR209 recommends that this date is preferably the equinox (see section 3.4).

2.3 DAYLIGHT

The BRE set out the methods for assessing daylight within a proposed building within section 2.1 and Appendix C of the handbook. This is based on the methods detailed in the BS EN 17037.

BS EN 17037 suggests two possible methodologies for appraising daylight:

- Illuminance Method
- Daylight Factor Method

These methodologies are discussed in more detail below.

Illuminance method

Climate Based Daylight Modelling (CBDM) is used to predict daylight illuminance using sun and sky conditions derived from standard meteorological data (often referred to as climate or weather data). This analytical method allows the prediction of absolute daylight illuminance based on the location and building orientation, in addition to the building's daylight systems (shading systems, for example). Annex A within the BS EN 17037 proposes values of target illuminances and minimum target illuminances to exceed 50 % of daylight hours over 50% or more of the assessment area.

BS EN 17037 sets out minimum illuminance levels (300 lux) that should be exceeded over 50% of the space for more than half of the daylight hours in the year. It also includes recommendations for medium and high daylighting levels within a space (500 lux and 700 lux respectively). It should be noted here, however, that these targets are specified irrespective of a space's use or design.

The National Annex suggests that these targets can be challenging to achieve within residential settings, particularly in areas of higher density and so suggests lower targets can be considered in this situation. It should be noted here that the reduced targets suggested within the BS EN 17037:2018 National Annex are provided so as to be comparable with the previous BR209's recommendations for ADF. These targets are:

- 100 lux for bedrooms
- 150 lux for living rooms
- 200 lux for living/kitchen/diners, kitchens, and studios.

It is however stated in paragraph C17 of the BRE that: *"Where a room has a shared use, the highest target should apply. For example in a bed sitting room in student accommodation, the value for a living room should be used if students would often spend time in their rooms during the day. Local authorities could use discretion here. For example, the target for a living room could be used for a combined living/dining/kitchen area if the kitchens are not treated as habitable spaces, as it may avoid small separate kitchens in a design".*

Daylight Factor method

This method involves calculating the median daylight factor on a reference plane (assessment grid).

"The daylight factor is the illuminance at a point on the reference plane in a space, divided by the illuminance on an unobstructed horizontal surface outdoors. The CIE standard overcast sky is used, and the ratio is usually expressed as a percentage."

This method of assessments considers an overcast sky, and therefore the orientation and location of buildings is not relevant. In order to account for different climatic conditions, Annex A within the BS EN 17037 sets equivalent daylight factor targets (D) for various locations in Europe.

The median daylight factor (MDF) should meet or exceed the target daylight factor relative to a given illuminance for more than half of daylight hours, over 50% of the reference plane.

2.4 SUNLIGHT

The BRE provide guidance in respect of sunlight quality for new developments within section 3.1 of the handbook. It is generally acknowledged that the presence of sunlight is more significant in residential accommodation than it is in commercial properties, and this is reflected in the BRE document.

It states, “in housing, the main requirement for sunlight is in living rooms, where it is valued at any time of the day, but especially in the afternoon. Sunlight is also required in conservatories. It is viewed as less important in bedrooms and in kitchens where people prefer it in the morning rather than the afternoon.”

The BRE guide considers the critical aspects of orientation and overshadowing in determining the availability of sunlight at a proposed development site.

The guide proposes minimising the number of dwellings whose living room face solely north unless there is some compensating factor such as an appealing view to the north, and it suggests a number of techniques to do so. Furthermore, it discusses massing solutions with a sensitive approach to overshadowing, so as to maximize access to sunlight.

At the same time, it acknowledges that the site’s existing urban environment may impose orientation or overshadowing constraints which may not be possible to overcome.

To quantify sunlight access for interiors where sunlight is expected, it refers to the BS EN 17037 criterion that the minimum duration of sunlight exposure in at least one habitable room of a dwelling should be 1.5 h on March 21st. Table A.5 also establishes medium and high sunlight targets (3 and 4 hours).

This is to be checked at a reference point located centrally to the window’s width and at the inner surface of the aperture (façade and/or roof). For multiple apertures in different façades it is possible to cumulate the time of sunlight availability if not occurring at the same time. The reference point is minimum 1.2 m above the floor and 0.3 m above the window sill if present.

The summary of section 3.1 of the guide states as follows:

“In general, a dwelling or non-domestic building which has a particular requirement for sunlight, will appear reasonably sunlit provided that:

- *At least one main window faces within 90 degrees of due south, and*
- *a habitable room, preferably a main living room, can receive a total of at least 1.5 hours of sunlight on 21 March. This is assessed at the inside centre of the window(s); sunlight received by different windows can be added provided they occur at different times and sunlight hours are not double counted.. ”*

2.5 FURTHER RELEVANT INFORMATION

CIBSE LG 10 ‘Daylighting – a guide for designers’.

This guide details the process of designing for daylighting. It outlines considerations of form, orientation, and other aspects involved in designing the building envelope to optimise natural light.

The guidance in this document is written primarily for buildings located within the UK, and will be most applicable to projects in northern hemisphere. However, the principles are universal, and can be applied to other locations if the appropriate weather data is used and local standards and regulations are respected

3 SIMULATION ASSUMPTIONS

In order to undertake the daylight and sunlight assessments set out in the previous pages, we have prepared a three dimensional computer model and used specialist lighting simulation software.

Calculation model

The three dimensional representation of the proposed development has been modelled using the drawings prepared by Lomax Architecture, received by GIA in June 2025. These have been placed in the context of their surrounding buildings which have been modelled from photogrammetry, OS and site photographs. This allows for a precise model, which in turn ensures that analysis accurately represents the amount of daylight and sunlight available to the building façades, internal and external spaces, considering all of the surrounding obstructions and orientation.

The weather file recorded at Gatwick Airport was considered the most relevant for this assessment.

Surfaces reflectance

In general, the reflectance value to be applied to surfaces in the computational modelling follows the BR 209 Annex C, unless specified by the design team. Assumptions applied are:

- Interior walls - 0.7
- Ceilings - 0.8
- Floors - 0.4
- Exterior ground and external obstructions - 0.2

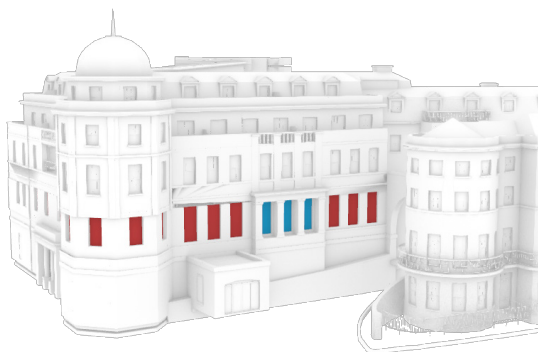


Fig. 01: Window maps - North-west view

Assessment Grids

For the daylight assessments, an analysis 'grid' is located within each room at working plane height (850 mm from FFL) and offset by 0.3m from the walls as recommended by BR 209.

Grid points are spaced by 0.2m .

Assessment Resolution

The climate-based daylight assessments have been undertaken on an hourly basis whilst the sunlight exposure assessment has been undertaken for every minute on the relevant days.

Glazing transmittance

A glazing visible light transmittance (VLT) of 70% has been used as in agreement with the wider design team. A framing factor has been taken from the elevations supplied. Maintenance factors have been applied as per BR209 with 0.92 for windows not beneath an overhang and 0.76 for windows beneath an overhang.

The final transmittance values are shown in the table below.

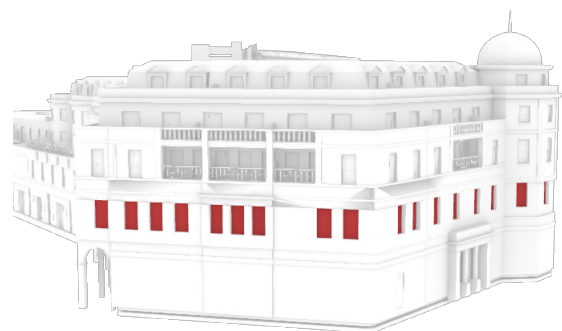


Fig. 02: Window maps - North-east view

BS EN 17037:2018						
Glazing Type	TV Normal	Building Type & Atmosphere (NA.2)	Glazing Exposure (NA.3)	Glazing Dirt/Weathering (NA.4)	Framing Factor	TV Total
Type 1	0.70	Urban (8)	Vertical (x1)	Not Sheltered (x1)	0.80	0.52
Type 2	0.70	Urban (8)	Vertical (x1)	Sheltered (x3)	0.80	0.43

Table 01: Transmittance and maintenance factors

4 SITE OVERVIEW



Fig. 03: Top view

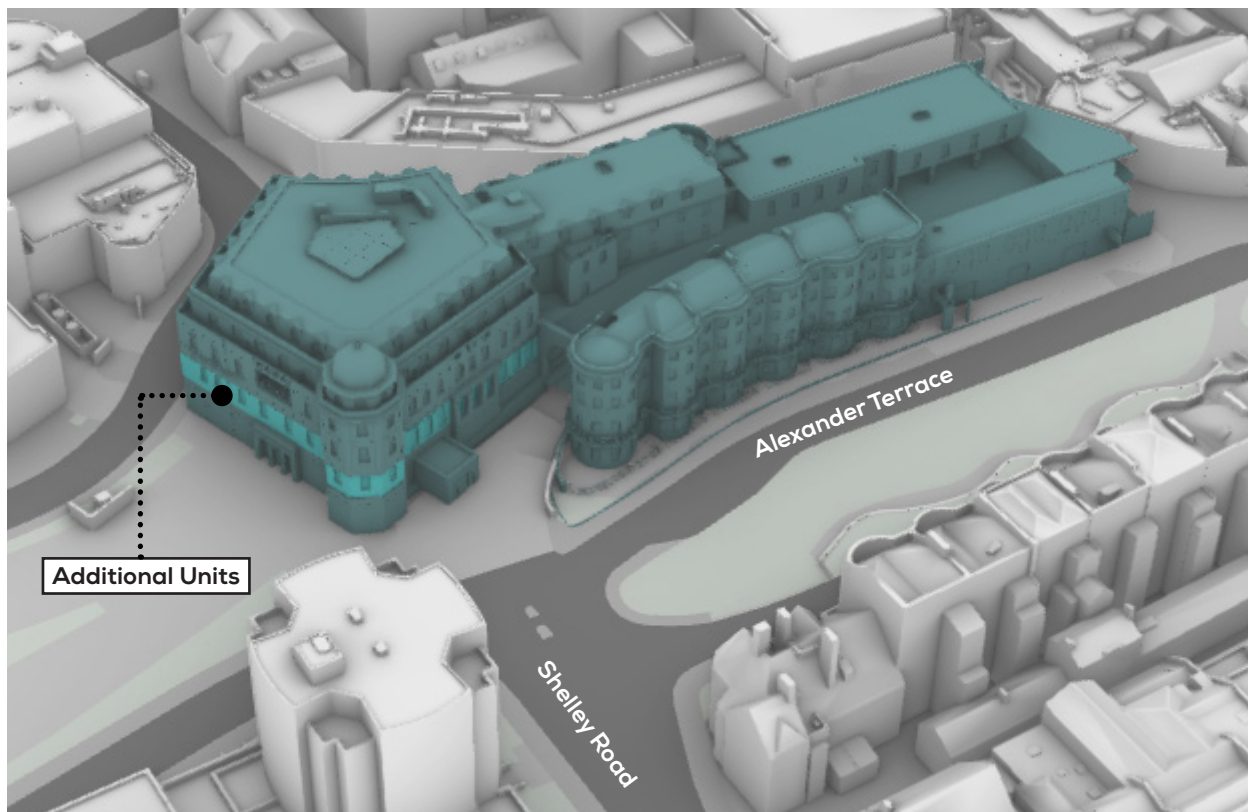


Fig. 04: Perspective view from north-west

5 TECHNICAL ASSESSMENTS

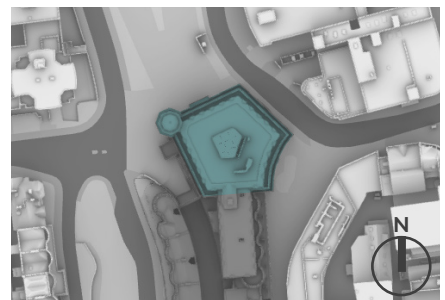
First Floor

			DAYLIGHT		SUNLIGHT	
ROOM REF.	FLAT	ROOM USE	MEDIAN DAYLIGHT ILLUMINANCE (lux)	TARGET (lux)	BY ROOM	
					WINDOW WITHIN 90° DUE SOUTH	21 MAR
LEVEL 01						
1	A	L/K/D	70	200	YES	00:00
2	A	BEDROOM	116	100	YES	01:38
3	A	BEDROOM	96	100	YES	02:13
4	B	BEDROOM	203	100	YES	03:58
5	B	BEDROOM	148	100	YES	04:06
6	B	L/K/D	256	200	YES	05:33
7	C	BEDROOM	311	100	YES	05:25
8	C	L/K/D	566	200	YES	07:03
9	C	BEDROOM	227	100	NO	00:00
10	D	BEDROOM	222	100	NO	00:00
11	D	L/K/D	206	200	NO	00:00
12	E	BEDROOM	189	100	NO	00:00
13	E	L/K/D	403	200	NO	00:00
14	F	BEDROOM	115	100	NO	00:00
15	F	L/K/D	209	200	NO	00:00
16	G	L/K/D	243	200	NO	00:00
17	G	BEDROOM	272	100	NO	00:00
18	G	BEDROOM	496	100	YES	05:19
19	H	BEDROOM	121	100	YES	04:29
20	H	L/K/D	123	200	YES	03:57
21	I	BEDROOM	163	100	YES	03:03
22	I	L/K/D	99	200	YES	02:31

Table 03: Assessment Data



Fig. 05: Floor Plan





What we do:

Building Surveying
Daylight & Sunlight
Light Obstruction Notices
Measured Surveys
Party Wall & Neighbourly Matters
Rights of Light
Solar PV
Wind Analysis

Where we are:

Belfast
Birmingham
Bristol
Dublin
London
Manchester