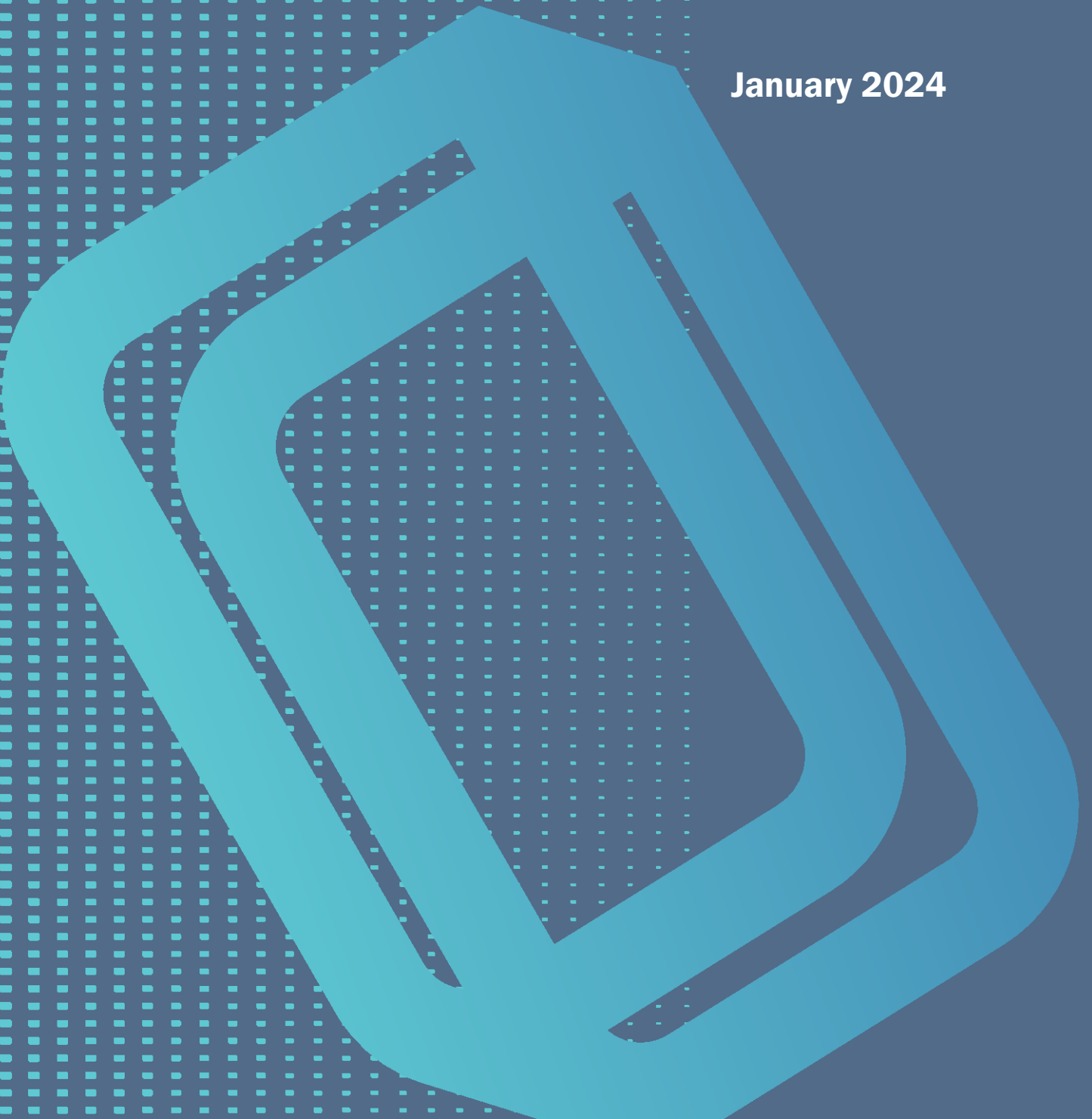


Wrotham Road

**Internal Daylight
Assessment**

January 2024



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1 EXECUTIVE SUMMARY

1.1 NRG Consulting have been commissioned to undertake an Internal Daylight Assessment on a proposed development consisting of a change of use and renovation of an existing building to create eleven residential units at 7 Wrotham Road, Gravesend, DA11 0QF.

1.2 The following guidelines have been followed to assess the proposed development:

- BRE's *Site Layout Planning for Daylight and Sunlight, A guide to good practice (BR 209)*, 3rd Ed.
- BS EN 17037:2018 *Daylight in Buildings*

1.3 The results of this report show that all the rooms achieve compliance with the internal daylight requirements set out in the BS EN 17037:2018.

1.4 In light of the above, it is considered that daylight should not be a constraint to the granting of planning permission.

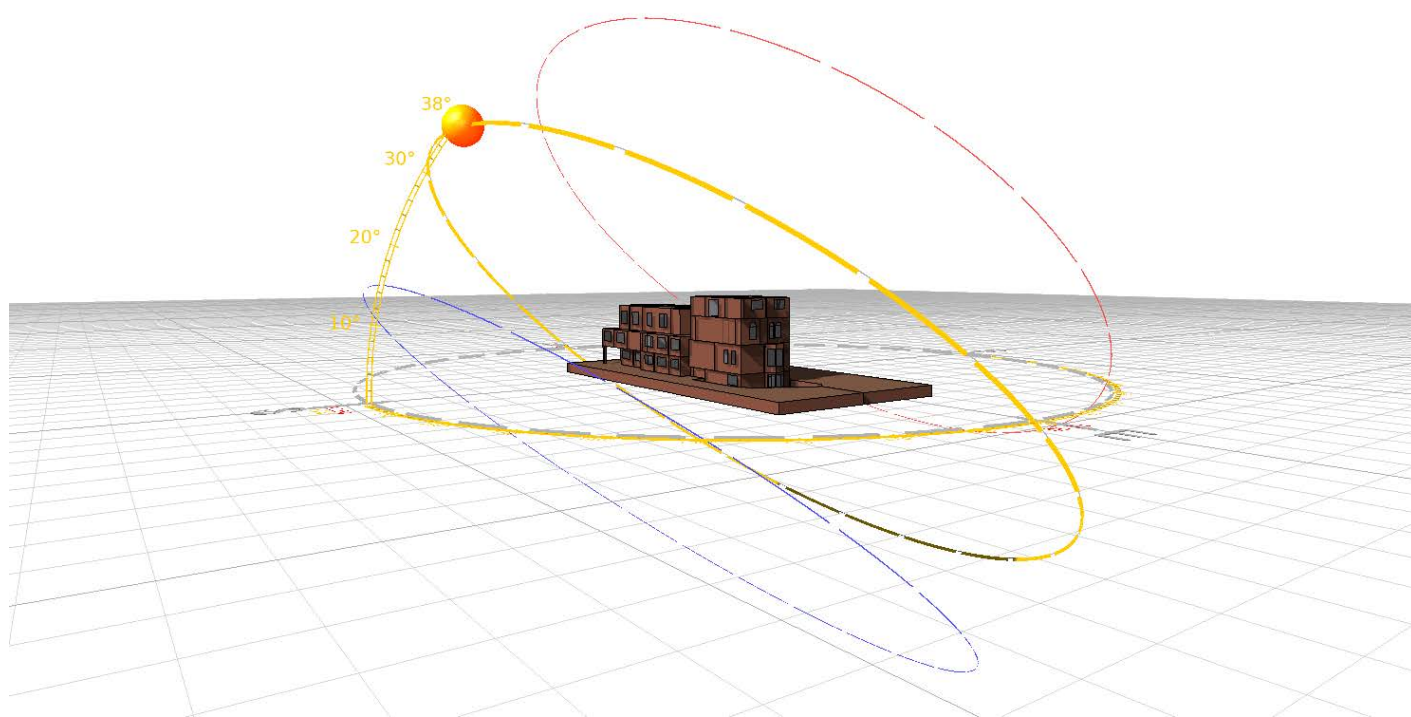


Figure 1: 3D model of proposed buildings.

2 INTRODUCTION

2.1 Background

The British Standard “Daylight in buildings” (BS EN 17037) contains advice and guidance on interior daylighting. For daylight provision in buildings, BS EN 17037 provides two methodologies. One is based on target illuminances from daylight to be achieved, the other, alternative, method is based on calculating the daylight factors.

NRG Consulting has proposed the following methodology to assess the layouts proposed:

- Carry out daylight assessment using the methodologies set out in by BRE and British Standard Guidelines for diffuse daylight and sunlight conditions.
- Prepare a 3D computer model to assess the internal daylight/illuminances for the living rooms, kitchens, and bedrooms of the proposed development.

2.2 The Nature and Effect of Daylight and Sunlight

The BRE “Site layout planning for daylight and sunlight – A guide to good practice” 3rd edition by Paul J. Littlefair was released in June 2022 and superseded the second edition of the same guidance. The most important update from the previous version of the guidelines is represented by the methods for assessing daylight within a proposed building within section 2.1 and Appendix C of the handbook. These are based on the methods detailed in the BS EN 17037 which suggests two possible methodologies for appraising daylight across a room’s working plane: Illuminance Method Daylight Factor Method.



Figure 2: BRE guidelines

3 DAYLIGHT AND SUNLIGHT ASSESSMENT GUIDANCE

3.1 Assessment of the Internal Daylight.

When assessing the internal daylight levels of proposed building projects, it is important to recognize the distinction between daylight and sunlight. Daylight is the combination of all direct and indirect sunlight during the daytime, whereas sunlight comprises only the direct elements of sunlight. On a cloudy or overcast day, diffuse daylight still shines through windows, even when sunlight is absent.

The BS EN 17037 provides criteria for the two methodologies, Illuminance Method and Daylight Factor Method

3.1.1 Illuminance method

This method involves using climatic data for the location of the site 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 (E_T) should be achieved across at least half of the reference plane in a daylit space for at least half of the daylight hours. Another target illuminance (E_{TM}) should also be achieved across 95% of the reference plane for at least half of the daylight hours; this is the minimum target illuminance to be achieved towards the back of the room.

Target illuminances from daylight over at least half of the daylight hours		
Level of recommendation	Target illuminance E_T (lx) for half of assessment grid	Target illuminance E_{TM} (lx) for 95% of assessment grid
Minimum	300	100
Medium	500	300
High	750	500

Table 1: Target illuminances for side lit rooms

3.1.2 Daylight factor method

This method involves the computation of the daylight factor at each calculation point on an assessment grid. The CIE standard overcast sky is used and the result is expressed in a percentage. The table below gives the daylight factor target for side lit rooms in London. The recommendations are met if both the target daylight factors are achieved.

Target daylight factors (D) for London		
Level of recommendation	Target daylight factor D for half of assessment grid	Target daylight factor D for 95% of assessment grid
Minimum	2.1%	0.7%
Medium	3.5%	2.1%
High	5.3%	3.5%

Table 2: Daylight factor targets for side lit rooms in London

3.1.3 Specific recommendations for daylight provision in UK dwellings

These are intended for 'hard to light' dwellings, for example in basements or with significant external obstructions, or for existing buildings being refurbished or converted into dwellings:

Target illuminances from daylight over at least half of the daylight hours	
Room	Target illuminance E_T (lx) for half of assessment grid
Kitchen	200
Living Room	150
Bedroom	100

Table 3: Specific recommendations for daylight provision in UK dwellings

Target daylight factors (DT) to achieve over at least 50% of the assessment grid			
Location	D_T for 100 lx (Bedroom)	D_T for 150 lx (Living room)	D_T for 200 lx (Kitchen)
London	0.7%	1.1%	1.4%

Table 4: Daylight factor target for 'hard to light' dwellings

4 METHODOLOGY APPLIED

4.1 Data

All the information has been taken directly from digital files provided by the Design Team. The height of any obstructions has been taken from survey data or from aerial photographs available online.



Figure 3: Aerial view of the site as existing.

4.2 Proposed Floor Plans

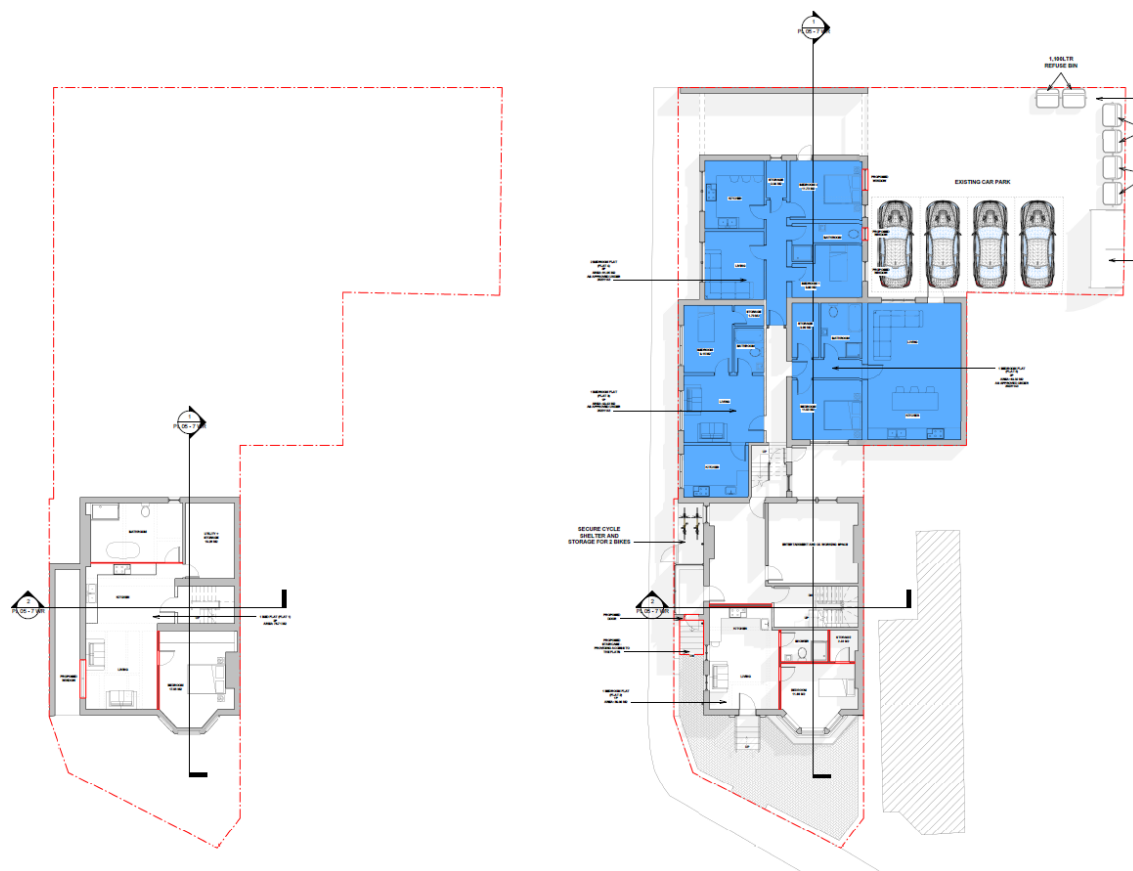


Figure 4: Proposed basement and ground floor plan

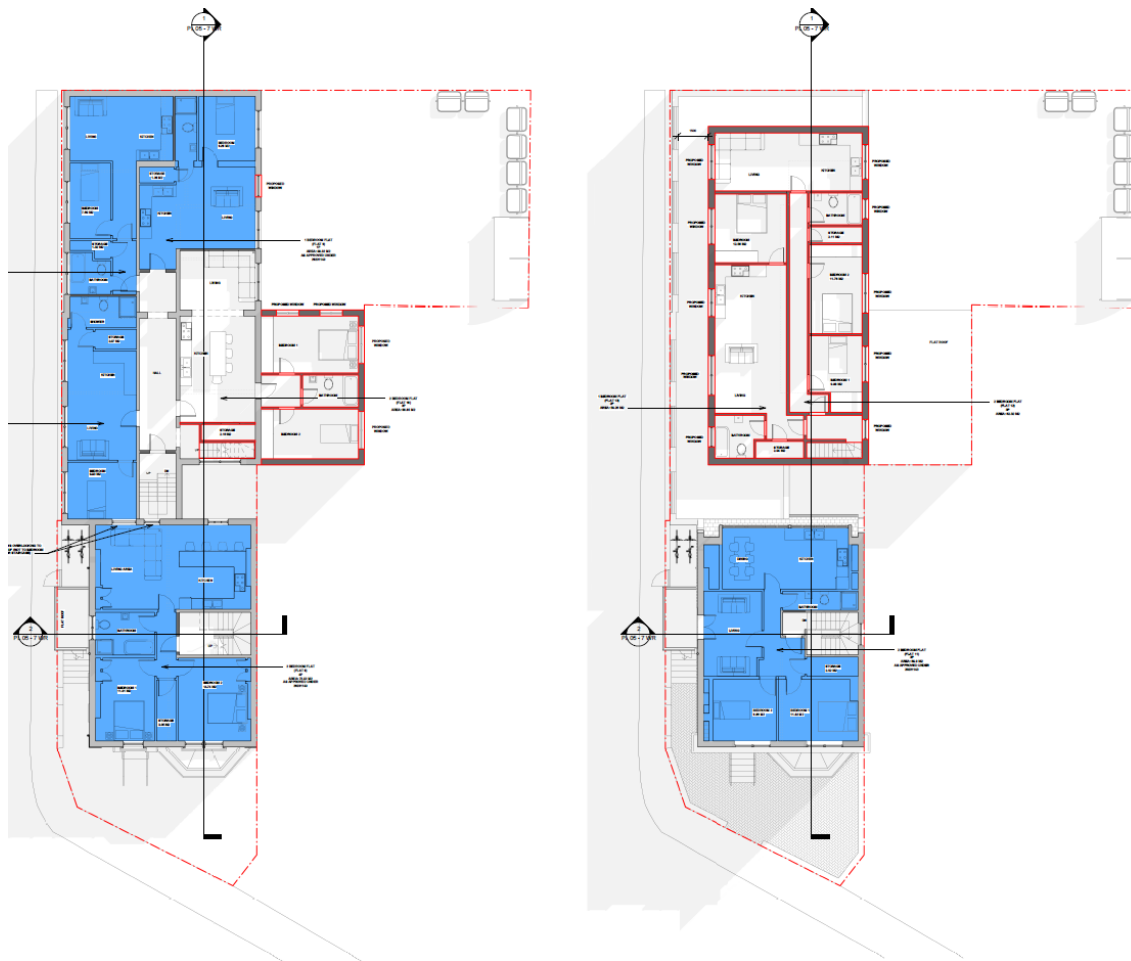


Figure 5: First and top floor plan

4.3 3D Model

To complete the internal daylight assessment, a full-size 3D model of the proposed development was constructed in IES ModelIT. The internal daylight has been assessed with IES Radiance, a thermal and environmental analysis program.

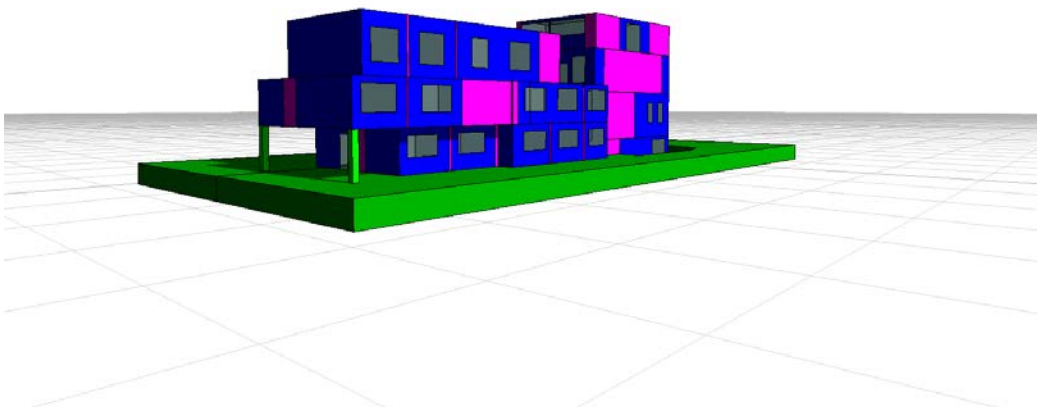


Figure 6: IES 3D model of the proposed development.

4.4 Internal Surface Properties

The reflectance for room internal surfaces poses an effect on internal daylight result, whereby lighter colours result in higher reflectance (white: 1.0; black:0.0). Table 2 below includes the internal surface properties used in this assessment.

Surface	Reflectance	
Floor	0.4 (e.g. light wood or grey tiles)	
Walls	0.7 (e.g. light pastel or white paint)	
Ceiling	0.7 (e.g. light pastel or white paint)	
Window	Light Transmittance	0.68

Table 5: Internal surface properties

4.5 Design Data

Drawing pack issued for Assessment in January 2024

 PL02-7WR-D - Proposed Basement and Ground Floor Plans	DWG File	3,216 KB
 PL02-7WR-D - Proposed Elevations	DWG File	1,657 KB
 PL02-7WR-D - Proposed First Floor and Loft Plans	DWG File	1,039 KB
 PL02-7WR-D - Proposed Roof Plan	DWG File	2,770 KB
 PL02-7WR-D - Proposed Sections	DWG File	739 KB
 PL02-7WR-D	Adobe Acrobat D...	2,464 KB

5 RESULTS

5.1 Target Illuminance Factor – Proposed Development

We have assessed the proposed new accommodation to determine whether the internal spaces will be provided with adequate daylight by reference to Target Illuminance (E_T) Factor. This method involves the computation of the illuminance level at each calculation point on an assessment grid.

The analysis of the internal space of the proposed development indicates that all the rooms comfortably exceed the acceptable criteria of both the BRE Guide and as also set within BS EN 17037:2018 in terms of Illuminance.

The results are summarised in the table below.

Unit	Room	Floor area that achieves the target (%)	Target to be achieved over 50% of the floor area (E_T)	BRE Compliant
1	Kitchen/living room	57	200	YES
	Bedroom	100	100	YES
2	Kitchen	100	200	YES
	Living room	100	150	YES
	Bedroom 1	100	100	YES
	Bedroom 2	100	100	YES
3	Kitchen/living room	62	200	YES
	Bedroom	79	100	YES
4	Kitchen	100	200	YES
	Living room	100	150	YES
	Bedroom	100	100	YES
5	Kitchen/living room	100	200	YES
	Bedroom	100	100	YES
6	Kitchen/living room	100	200	YES
	Bedroom	100	100	YES
7	Kitchen/living room	96	200	YES
	Bedroom	100	100	YES
8	Kitchen/living room	100	200	YES
	Bedroom	100	100	YES
9	Kitchen/living room	58	200	YES
	Bedroom 1	100	100	YES
	Bedroom 2	100	100	YES

10	Kitchen/living room	100	200	YES
	Bedroom 1	100	100	YES
	Bedroom 2	100	100	YES
11	Kitchen	100	200	YES
	Living room	100	150	YES
	Bedroom 1	100	100	YES
	Bedroom 2	100	100	YES
12	Kitchen/living room	100	200	YES
	Bedroom 1	100	100	YES
	Bedroom 2	100	100	YES
13	Kitchen/living room	100	200	YES
	Bedroom	100	100	YES

Table 6: Internal daylight results

6 CONCLUSION

The Illuminance Factor (E) for the internal spaces of the proposed development located at 7 Wrotham Road, Gravesend, DA11 0QF has been carried out as part of this assessment. We conclude that daylight levels within the proposed habitable rooms are adequate and exceed the target criteria set within *BS EN 17037:2018* and BRE publication “Site Layout Planning for Daylight & Sunlight – A guide to good practice” [Section 5.1].

As per the findings of this report, it is considered that the proposed internal daylight levels should not be a constraint to the granting of planning permission.

