



**SYNTEGRA CONSULTING**  
*Intelligent & Green Building Solutions*



**Internal  
Daylight  
Analysis  
-  
Planning  
Application  
Report**

October 2014

148 Kentish Town Road, London, NW1 9QB



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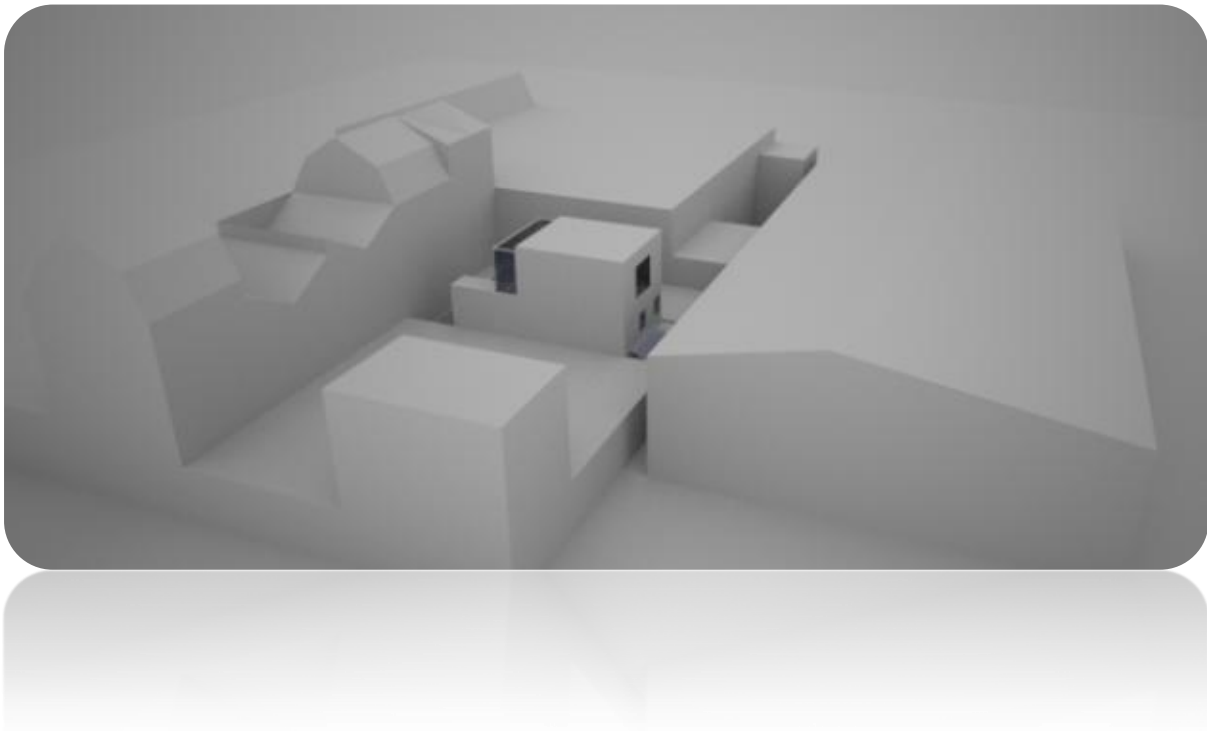


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06.10.2014	HC	AWK



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## 1. Executive summary

This report demonstrates that adequate levels of internal daylight are met on 100% of the habitable rooms.

This report demonstrates that the No-Sky Line (NSL) criteria is met on 25% of the habitable rooms. The 3 rooms falling short of NSL all see levels of NSL above 60% (except one with NSL above 35%) and with acceptable levels of average daylight factor (ADF), can be still be considered well daylight.

↪ **On balance, due to the building being located in a dense urban environment with buildings close by, the breaches of NSL for some of the rooms can be offset by the adequate daylight distribution and it can be concluded that the proposed design is acceptable.**

## 2. Introduction

This report has been prepared to support the planning application for the proposed development at 148 Kentish Town Road, London, NW1 9QB. The site is currently a 5 storey building with the ground and mezzanine floors completely extended to the back and the future project involves the redevelopment of the extension into a 3 storey building consisting of 1 studio and 1 flat.

The report assesses the internal daylight within the residential flats of the proposed development and specifically focuses on the kitchens, living/dining rooms and bedrooms. The assessment is undertaken in accordance with "**BRE 209 Digest: Site Layout Planning For Daylight and Sunlight – A Guide to Good Practice**". 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 Application Manual on Window Design of the Chartered Institution of Building Services Engineers (CIBSE).

The existing & proposed drawings (in AutoCAD format) of the project were provided by **GA&A Design Ltd** on the **03<sup>rd</sup> October 2014** and have been used in preparing this report.

The study has been undertaken by constructing a 3D IES model of the proposed site and surrounding buildings in order to analyse the internal daylight within the apartments. All images used in this report are technical 3D models created using 2D AutoCAD drawings (floor plans, sections and elevations) and not 3D visualisation images.





### 3. Planning policy

Where the proposed development has the potential to negatively impact the existing levels of daylight or sunlight on neighbouring properties, a daylight and sunlight assessment has to accompany the planning application.

The daylight and sunlight assessment includes the necessary information to meet the criteria outlined in the Site layout planning for daylight and sunlight: a guide to good practice published by the Building Research Establishment (BRE).

### 4. Guidance document

#### 4.1. Building Research Establishment (BRE) report (BRE 209): "Site layout planning for daylight and sunlight: A guide to good practice" Second Edition (2011)

The Second Edition of the report replaces the 1991 document of the same name and came into effect from October 2011.

It is important to note that the introduction to the report stresses that the document is provided for guidance purposes only and it is not intended to be interpreted as a strict and rigid set of rules. It also recommends that it may be appropriate to adopt a flexible approach and alternative target values in dealing with "special circumstances" 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". This is amplified by the following extracts from the introduction (p1, para. 6) and Section 2.2:

*"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". (p1, para. 1.6)*

*"In special circumstances the Developer or Planning Authority may wish to use different target values". (p1, para. 1.6)*

*"Note that numerical values given here are purely advisory. Different criteria may be used, based upon the requirements for daylight in an area viewed against other site layout constraints. Another important issue is whether the existing building is itself a good neighbour, standing a reasonable distance from the boundary and taking no more than its fair share of light". (p7 para. 2.2.3)*

The examples given in the report can be applied to any part of the country: suburban, urban and rural areas. The inflexible application of the target values given in the report may make reaching the BRE criteria difficult in a tight, urban environment where there is unlikely to be the same expectation of daylight and sunlight amenity as in a suburban or rural environment.

## 5. Assessment methodology

### 5.1. General

This report analyses the levels of internal daylight at the following flats:

-Ground Floor:

Flat 1- Studio Flat

-First Floor:

Flat 2- Bedroom 1

Flat 2- Bedroom 2

-Second Floor:

Flat 2- Kitchen/Dining/Living

Specifically, it takes into consideration the Average Daylight Factor (ADF) in kitchens, living/dining rooms and bedrooms (habitable rooms only).

4 target rooms (R1 to R4) as shown in section 9.4 in Appendix, have been identified on the proposed drawings following guidance within the BRE guidelines "*Site layout planning for daylight and sunlight*".

The IES Virtual Environment modelling software utilised for the compilation of this report has been accredited by CIBSE and acknowledged by the BRE as a suitable software tool for undertaking internal daylight assessments in accordance with the BRE Good Practice guidelines. The specific IES software modules utilised for this assessment are the following:

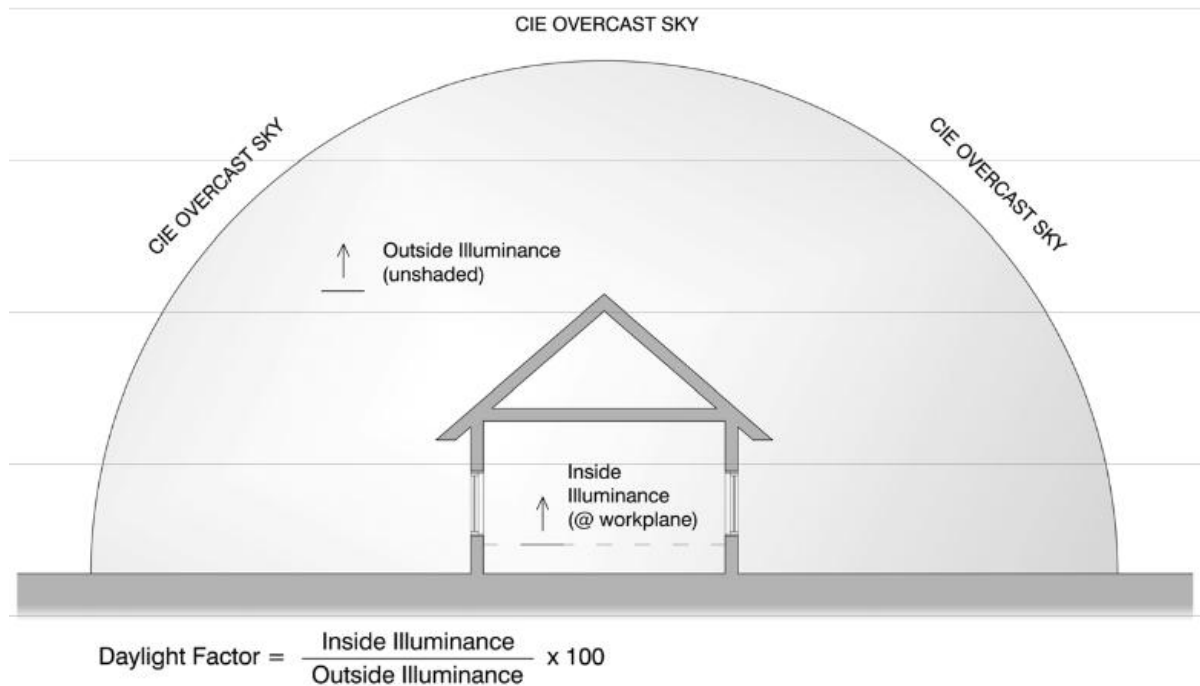
- ModelIT: enables you to create a 3D "Virtual Environment" model without CAD data, or alternatively allows you to create a 3D model from 2D CAD data. Interfaces with AutoCAD and Google Sketchup.
- FlucDL: allows to calculate point by point illuminance and daylight factors on any surfaces in the model or on specified workplanes (e.g. the height of a desk).

## 5.2. BRE Digest 209: "Site layout planning for daylight and sunlight"

This section provides a brief description of the calculating methods for the daylight, sunlight and overshadowing to gardens and open spaces criteria presented in BRE Digest 209.

### 5.2.1. Average Daylight Factor (ADF)

The Average Daylight Factor (ADF) is the average indoor illuminance (from daylight) on the working plane within a room, expressed as a percentage of the simultaneous outdoor illuminance on a horizontal plane under an unobstructed CIE "standard overcast sky".



The BRE guidelines "Site layout planning for daylight and sunlight" incorporate two main methods of calculating daylight: the Vertical Sky Component (VSC) method and the Average Daylight Factor (ADF) method.

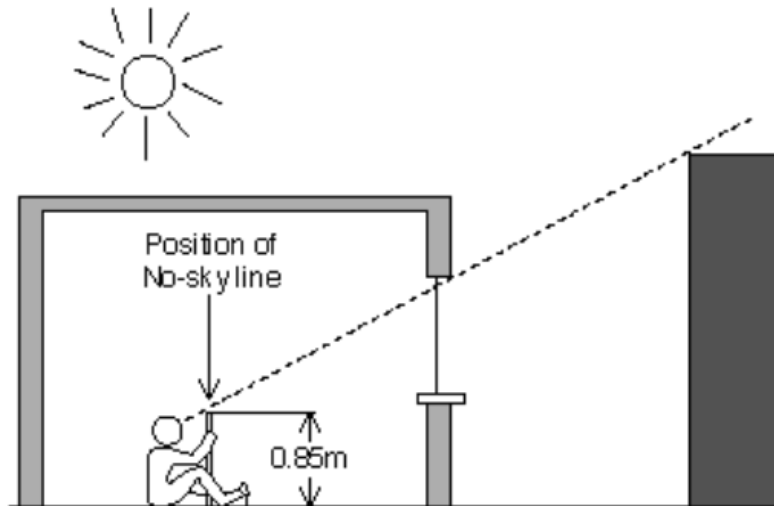
The ADF method of assessment takes into account the total glazed area to the room, the transmittance quality of the glazing proposed, the total area of the room surfaces including ceilings and floors, and the internal average reflectance for the room being assessed. The method also takes into account the Vertical Sky Component and the quantum of reflected light off external surfaces.

In this assessment, the ADF method is selected and more details on the numerical criteria for the VSC method are presented in section 9.6.



### 5.2.2. No-Sky Line (NSL)

This method of assessment is a simple test to establish where within the proposed room the sky will be visible through the windows, taking into account external obstructions. The assessment is undertaken at working plane height (850mm above floor level) and the method of calculation is set out in Appendix D of the BRE handbook.



Appendix C of the BRE handbook states “if a significant area of the working plane lies beyond the no skyline (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.” To guarantee a satisfactory daylight uniformity, this area is more precisely quantified in the BS 8206 Part2 2008 as 20%.

More details on the numerical criteria for the NSL method are presented in section 9.6.



## 6. BRE Digest 209: Significant criteria

### 6.1. Average Daylight Factor and No-Sky Line

The daylight criteria given within the BRE guidelines have been used as a basis to assess the internal daylight:

"If a predominantly daylit appearance is required, then ADF should be 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary electric lighting is provided. There are additional recommendations for dwellings, of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms. These last are minimum values of Average Daylight Factor, and should be obtained even if a predominantly daylit appearance is not required".

The Code for Sustainable Homes: technical guide (Nov 2010) recommends that kitchens must achieve a minimum Average Daylight Factor (ADF) of at least 2%, all living rooms, dining rooms and studies (including any room designated as a home office under Ene 9 – Home Office) must achieve a minimum Average Daylight Factor of at least 1.5% and 80% of the working plane in each kitchen, living room, dining room, and study (including any room designated as a home office under Ene 9 – Home Office) must receive direct light from the sky.

### 6.2. Criteria for Average Daylight Factor and No-Sky Line

The table 1 is a summary of the criteria to assess the ADF and NSL.

Room function	Criteria
Kitchen	ADF > 2.0%
Living/Dining room	ADF > 1.5%
Bedroom	ADF > 1.0%
No-Sky Line: % of working plane in each rooms	≥ 80%

*Table 1: Criteria for assessing ADF and NSL*

## 7. Assessment

### 7.1. BS 8206-2: 1992

The foreword to BS 8206-2: 1992 states that:

*“The aim of the standard is to give guidance to architects, builders and others who carry out lighting design. It is recognised that lighting is only one of many matters that influence fenestration. These include other aspects of environmental performance (such as noise, thermal equilibrium and the control of energy use), fire hazards, constructional requirements, the external appearance and the surroundings of the site. The best design for a building does not necessarily incorporate the ideal solution for any individual function. For this reason, careful judgement should be exercised when using the criteria given in the standards for other purposes, particularly town planning control.”*

### 7.2. Average Daylight Factor and No-Sky Line

The daylight results are presented in section 9.6 in Appendix.

(K = kitchen, L = Living, D = Dining, B = Bedroom)

**A summary of results is displayed in the table 2 below:**

Room location & function	Internal daylight assessment			Result
	ADF (criteria)	ADF (result)	NSL	
<b>R1 – Flat 1 Studio Flat – Ground Floor</b>	2.0%	2.0%	37%	PASS
<b>R2 – Flat 2- Bedroom 1- First Floor</b>	1.0%	1.4%	68%	PASS
<b>R3 – Flat 2 – Bedroom 2- First Floor</b>	1.0%	1.3%	60%	PASS
<b>R4 – Flat 2 – Living/Dining/Kitchen- Second Floor</b>	2.0%	4.1%	100%	PASS

*Table 2: Internal daylight results*

*Note: For location of target surfaces, see Appendix section 9.1 “Site plan and location”*

- ✓ As it can be seen in the table above, all the habitable rooms achieve the relevant ADF criteria.
- ✗ However 3 out of 4 rooms failed to meet the NSL criteria.
  - As the kitchens/living/dining rooms are "open plan" they are considered as one room therefore the minimum criteria of 2.0% (kitchen) would need to be achieved.

It should be noted that the values provided in the BRE 209 are for guidance purposes only.

## 8. Conclusion

### 8.1. Average Daylight Factor

This report demonstrates that adequate levels of internal daylight are met on 100% of the habitable rooms.

### 8.2. No-Sky Line

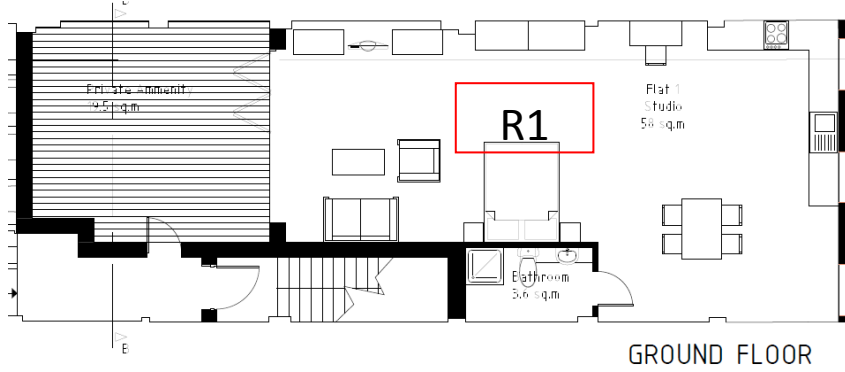
This report demonstrates that the No-Sky Line (NSL) criteria is met on 25% of the habitable rooms. The 3 rooms falling short of NSL all see levels of NSL above 60% (except one with NSL above 35%) and with acceptable levels of average daylight factor (ADF), can be still be considered well daylight.

⇒ **On balance, due to the building being located in a dense urban environment with buildings close by, the breaches of NSL for some of the rooms can be offset by the adequate daylight distribution and it can be concluded that the proposed design is acceptable.**

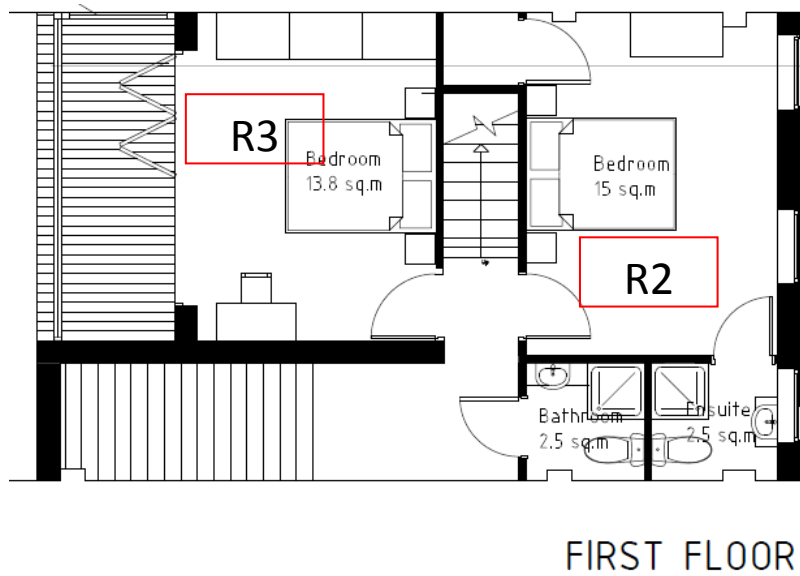
## 9. Appendix

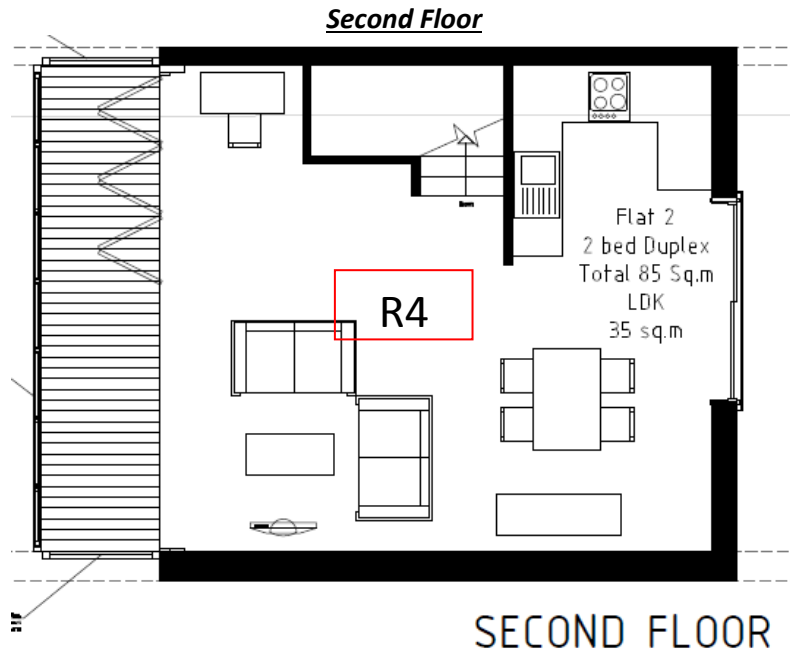
### 9.1. Site plan and location

#### Ground Floor



#### First Floor

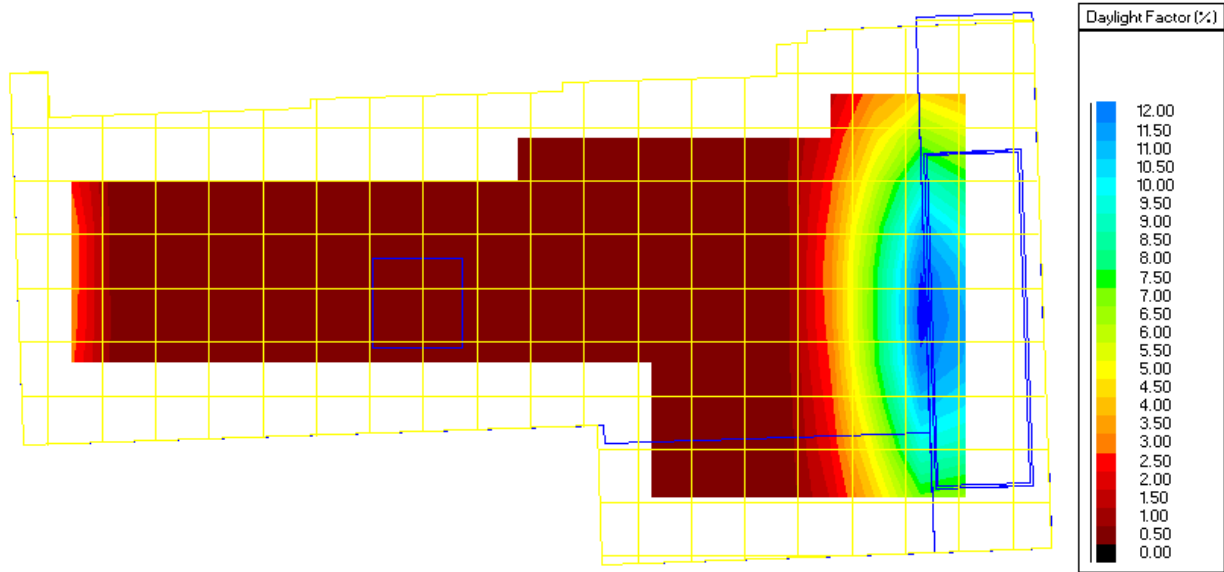




<b>Location</b>	<b>148 Kentish Town Road, London, NW1 9QB</b>
<b>Latitude (°)</b>	51.55 N
<b>Longitude (°)</b>	0.14 W

## 9.2. ADF and No-Sky Line results

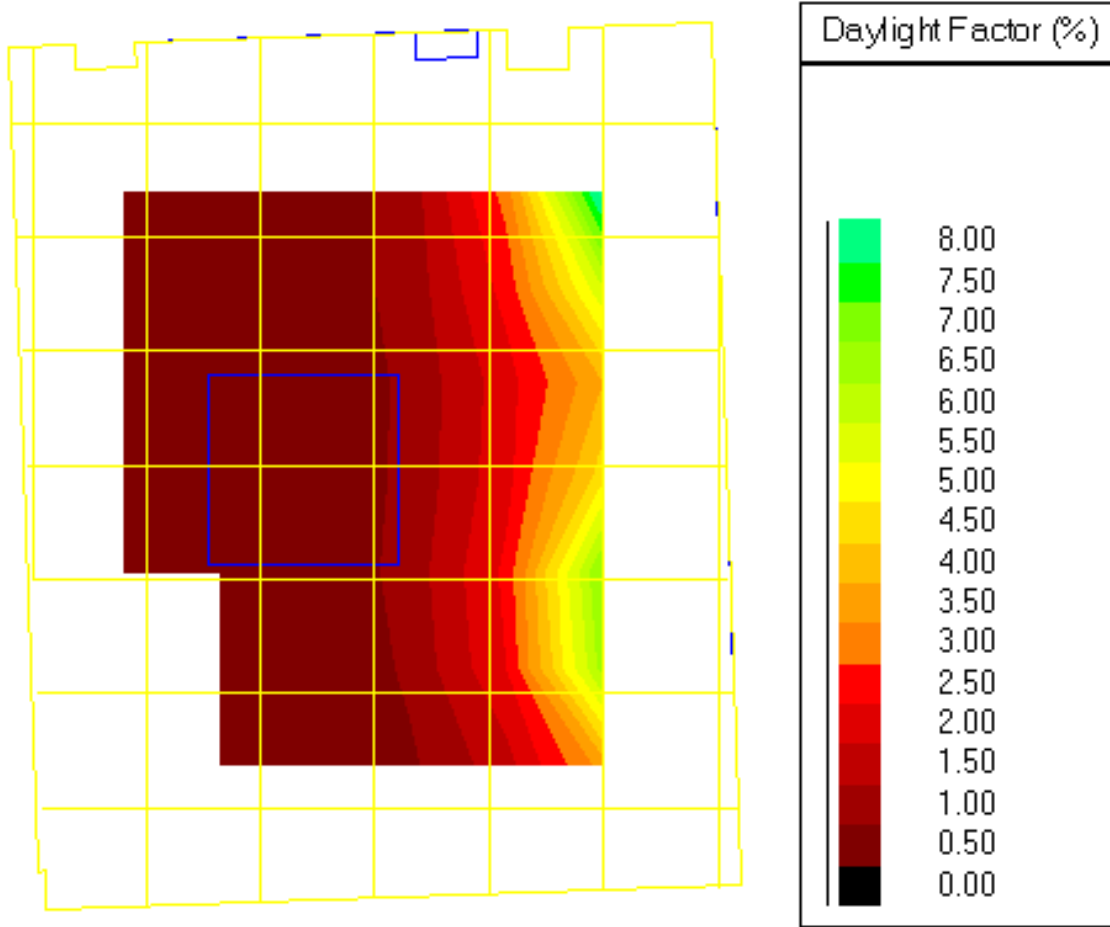
R1 – Flat 1 Studio Flat – Ground Floor



Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=35.769m <sup>2</sup> Margin=0.50 m	Daylight factor	0.0 %	2.0 %	12.3 %	0.00	0.00
	Daylight illuminance	0.93 lux	240.31 lux	1501.80 lux	0.00	0.00
	Sky view	0.00	0.37	1.00	0.00	0.00

R2 – Flat 2- Bedroom 1- First Floor

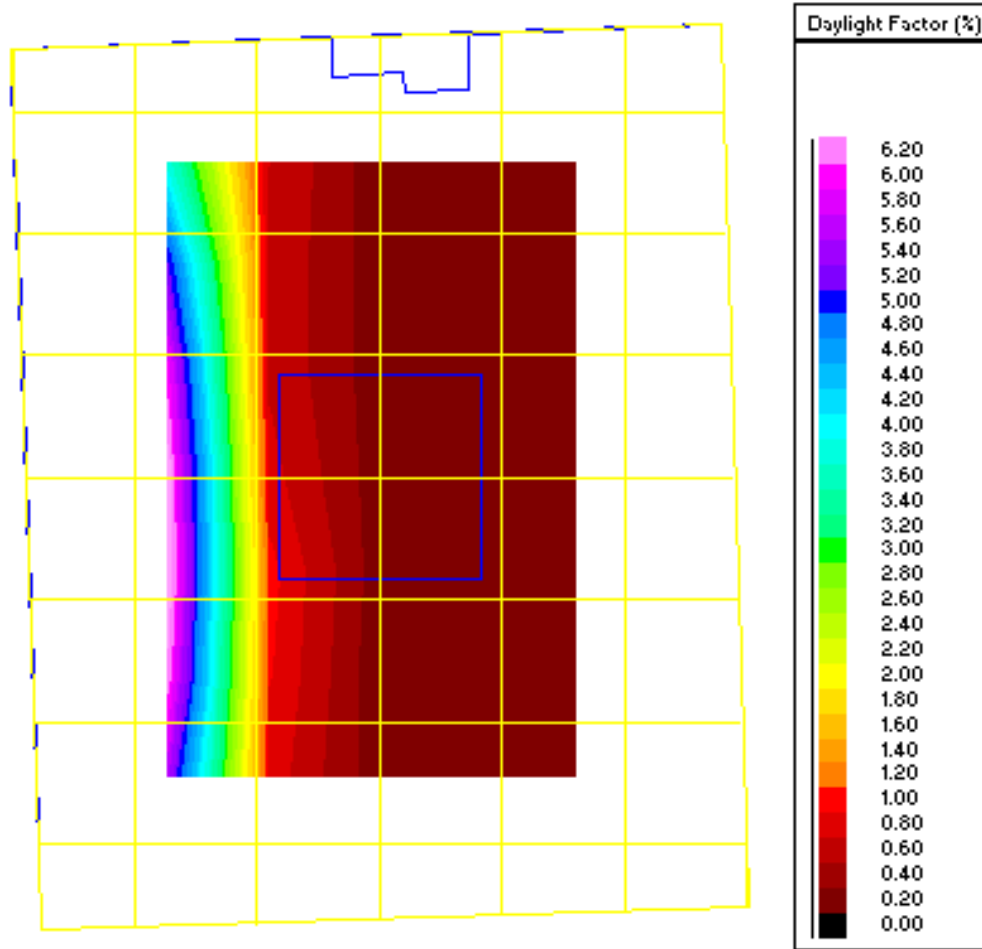


Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=9.040m <sup>2</sup> Margin=0.50 m	Daylight factor	0.0 %	1.4 %	8.1 %	0.01	0.00
	Daylight illuminance	1.37 lux	170.25 lux	986.29 lux	0.01	0.00
	Sky view	0.00	0.68	1.00	0.00	0.00



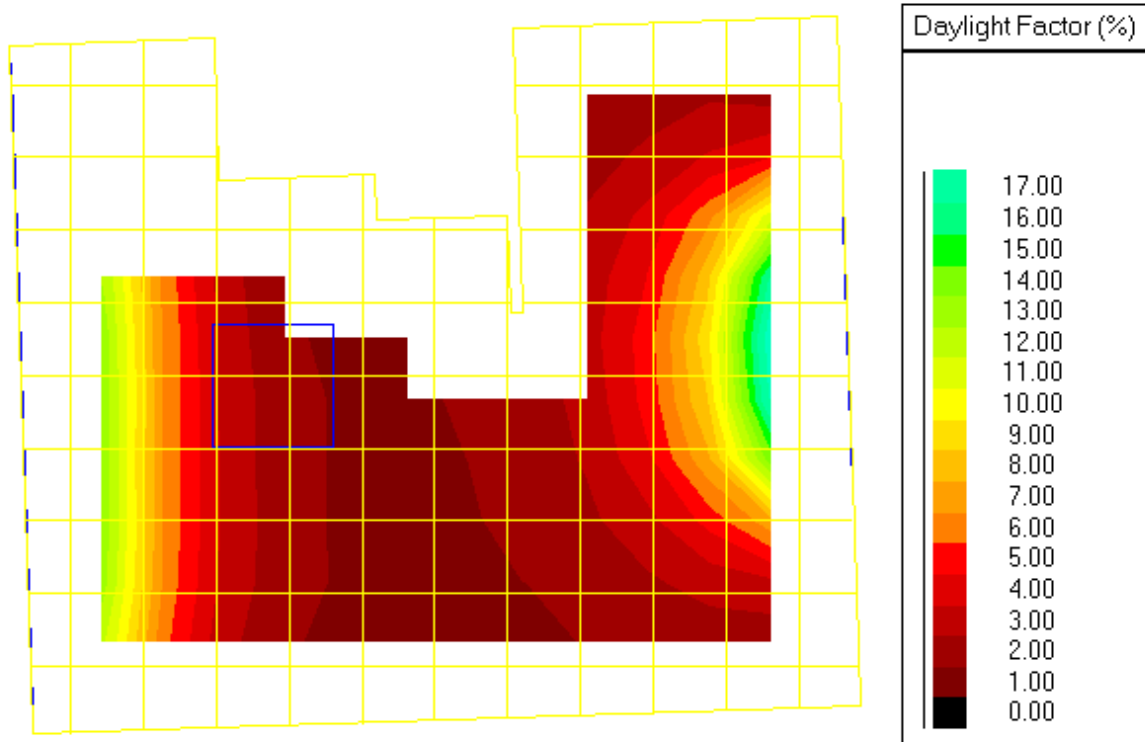
R3 – Flat 2 – Bedroom 2- First Floor



Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=8.261m <sup>2</sup> Margin=0.50 m	Daylight factor	0.1 %	1.3 %	6.4 %	0.04	0.01
	Daylight illuminance	6.11 lux	158.69 lux	780.55 lux	0.04	0.01
	Sky view	0.00	0.60	1.00	0.00	0.00

R4 – Flat 2 – Living/Dining/Kitchen- Second Floor



Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=21.536m <sup>2</sup> Margin=0.50 m	Daylight factor	0.6 %	4.1 %	17.7 %	0.15	0.04
	Daylight illuminance	77.51 lux	507.01 lux	2157.00 lux	0.15	0.04
	Sky view	1.00	1.00	1.00	1.00	1.00