TURNER JOMAS & ASSOCIATES

Environmental & Civil Engineers & Transport Planners

Internal Daylight Assessment

For the site of:
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Revision	-
Date	13/11/2018
Prepared by	E.Cao (on behalf of Turner Jomas Associates Ltd)
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Forecast cost estimates do not include such costs associated with any negotiations, appeals or other non- technical actions associated with the agreement on measures to meet the requirements of the authorities, nor are potential business loss and interruption costs considered that may be incurred as part of any technical measures.

Contents

1 EXECUTIVE SUMMARY

This report demonstrates that the Average Daylight Factor (ADF) criteria set by the BRE guidance are met on all rooms.

This report demonstrates that the No-Sky Line criteria are met on 80% of the rooms. These rooms (R13, R14, R15, R16, R17, R18) are located on the ground floor and will not meet the NSL factor due to the higher obstruction angle. However, the percentage of No-Sky Line for these rooms is not considered of concern as the ADFs are met and will provide adequate levels of daylight for the rooms.

→ **On balance the assessment has shown that 100% of the rooms meet or exceed BRE recommendations for internal daylight. Therefore, the proposed development will provide good residential accommodations which will enjoy good levels of daylight.**

2 INTRODUCTION

This report has been prepared to support the planning application for the proposed development at 138-140 Highgate Road Highgate London NW5 1PB. The proposed scheme involves a new development of the site to provide 6 X 4 bedrooms residential units.

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 **Jomas** on the **November 2018** and have been used in preparing this report.

No.	Document Name	Format	Received Date
1	0067_140 Highgate Road_Planning_Post DRP Design Highgate Height Changed_301018	dwg	01-11-2018
2	0067 140 HIghgate Road REVISION B 3d model	dwg	07-11-2018
3	0067_140 Highgate Road_Planning_Post DRP Design Highgate Height Changed_121118	dwg	12-11-2018

Table 1 Document list used for assessment

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

3 GUIDANCE DOCUMENT

3.1. 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.

3.2. 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."

4 ASSESSMENT METHODOLOGY

4.1. General

This report analyses the levels of internal daylight at the following rooms. The location of the assessed rooms is in section 7.4.

-Lower Ground Floor:

Unit 01 - R01 Kitchen/ Living room - LGF
Unit 02 - R02 Kitchen/ Living room - LGF
Unit 03 - R03 Kitchen/ Living room - LGF
Unit 04 - R04 Kitchen/ Living room - LGF
Unit 05 - R05 Kitchen/ Living room - LGF
Unit 06 - R06 Kitchen/ Living room - LGF

-Ground Floor:

Unit 01 - R07 Bedroom - GF
Unit 02 - R08 Bedroom - GF
Unit 03 - R09 Bedroom - GF
Unit 04 - R10 Bedroom - GF
Unit 05 - R11 Bedroom - GF
Unit 06 - R12 Bedroom - GF
Unit 01 - R13 Bedroom - GF
Unit 02 - R14 Bedroom - GF
Unit 03 - R15 Bedroom - GF
Unit 04 - R16 Bedroom - GF
Unit 05 - R17 Bedroom - GF
Unit 06 - R18 Bedroom - GF

-Upper Ground Floor:

Unit 01 - R19 Bedroom - UGF
Unit 02 - R20 Bedroom - UGF
Unit 03 - R21 Bedroom - UGF
Unit 04 - R22 Bedroom - UGF
Unit 05 - R23 Bedroom - UGF
Unit 06 - R24 Bedroom - UGF
Unit 01 - R25 Bedroom - UGF
Unit 02 - R26 Bedroom - UGF
Unit 03 - R27 Bedroom - UGF
Unit 04 - R28 Bedroom - UGF
Unit 05 - R29 Bedroom - UGF
Unit 06 - R30 Bedroom - UGF

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

30 target rooms (R1 to R30) as shown in section 7.4, 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:

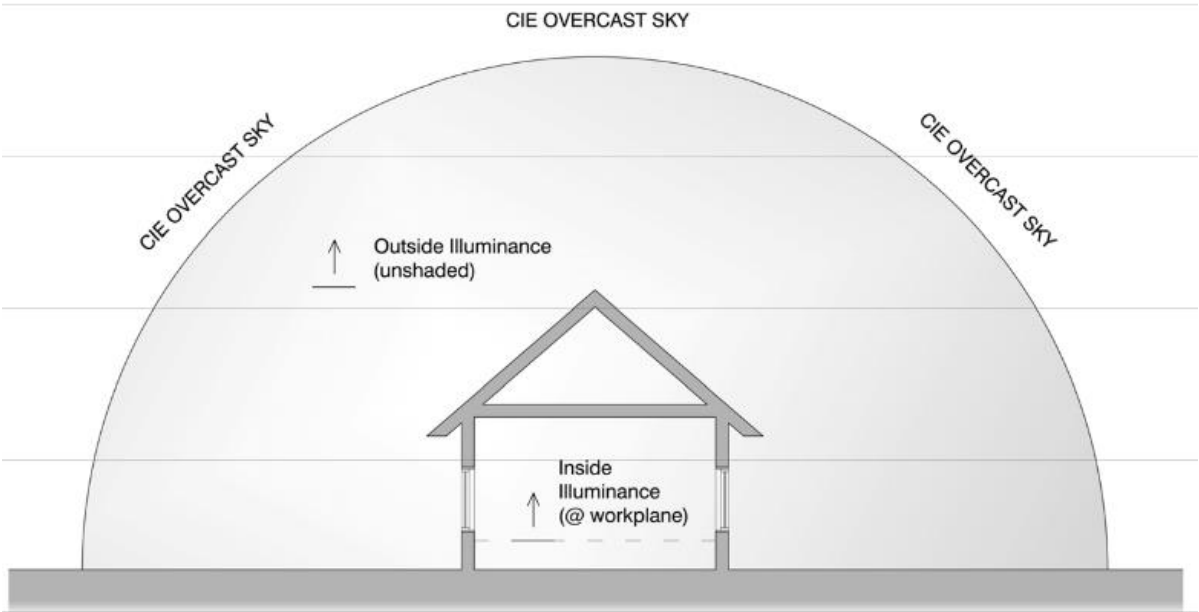
- ☐ ModelIT: enables you to create a 3D "Virtual Environment" model without CAD data, or alternatively allows you to create a 3D model from 2D CAD data. Interfaces with AutoCAD and Google Sketchup.
- ☐ FlucDL: allows to calculate point by point illuminance and daylight factors on any surfaces in the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

4.2. BRE 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.

4.3. 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".



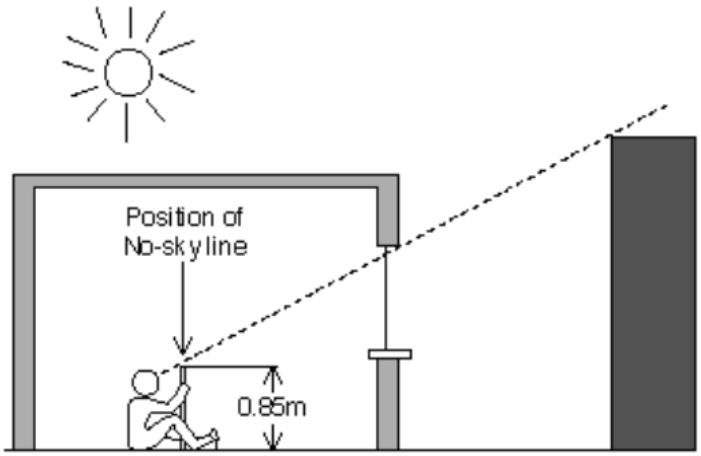
$$\text{Daylight Factor} = \frac{\text{Inside Illuminance}}{\text{Outside Illuminance}} \times 100$$

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.

4.4. 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%.

4.5. Criteria for Average Daylight 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".

5 ASSESSMENT

5.1. 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."

5.2. Average Daylight Factor and No-Sky Line

A summary of results is displayed in the table 2 below:
(K = kitchen, L = Living, D = Dining, B = Bedroom)

Internal daylight assessment					
Flat/Room	**Room function**	**ADF (criteria)**	**ADF (result)**	**NSL**	**Result**
R01 - LGF	K / D / L	2%	3.3	0.83	PASS
R02 - LGF	K / D / L	2%	4.0	0.83	PASS
R03 - LGF	K / D / L	2%	4.3	0.85	PASS
R04 - LGF	K / D / L	2%	3.8	0.85	PASS
R05 - LGF	K / D / L	2%	4.2	0.85	PASS
R06 - LGF	K / D / L	2%	3.1	0.83	PASS
R07 - GF	B	1%	2.7	0.98	PASS
R08 - GF	B	1%	3.7	0.98	PASS
R09 - GF	B	1%	3.5	1.00	PASS
R10 - GF	B	1%	3.6	1.00	PASS
R11 - GF	B	1%	4.1	1.00	PASS
R12 - GF	B	1%	4.1	1.00	PASS
R13 - GF	B	1%	2.2	0.63	PASS
R14 - GF	B	1%	1.1	0.67	PASS
R15 - GF	B	1%	1.0	0.48	PASS

R16 - GF	B	1%	1.2	0.48	PASS
R17 - GF	B	1%	1.2	0.52	PASS
R18 - GF	B	1%	1.4	0.50	PASS
R19 - UGF	B	1%	8.7	1.00	PASS
R20 - UGF	B	1%	8.5	1.00	PASS
R21 - UGF	B	1%	10.3	1.00	PASS
R22 - UGF	B	1%	10.4	1.00	PASS
R23 - UGF	B	1%	10.4	1.00	PASS
R24 - UGF	B	1%	8.6	1.00	PASS
R25 - UGF	B	1%	11.1	1.00	PASS
R26 - UGF	B	1%	8.8	0.91	PASS
R27 - UGF	B	1%	7.6	0.91	PASS
R28 - UGF	B	1%	7.4	0.91	PASS
R29 - UGF	B	1%	7.3	0.82	PASS
R30 - UGF	B	1%	6.6	0.95	PASS

Table 2: Internal daylight results

On balance the assessment has shown that all of the assessed rooms meet or exceed BRE recommendations for internal daylight. Therefore, the proposed development will provide good residential accommodations which will enjoy good levels of daylight.

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

6 CONCLUSION

6.1. Average Daylight Factor

This report demonstrates that the Average Daylight Factor criteria set by the BRE guidance are met on all the rooms.

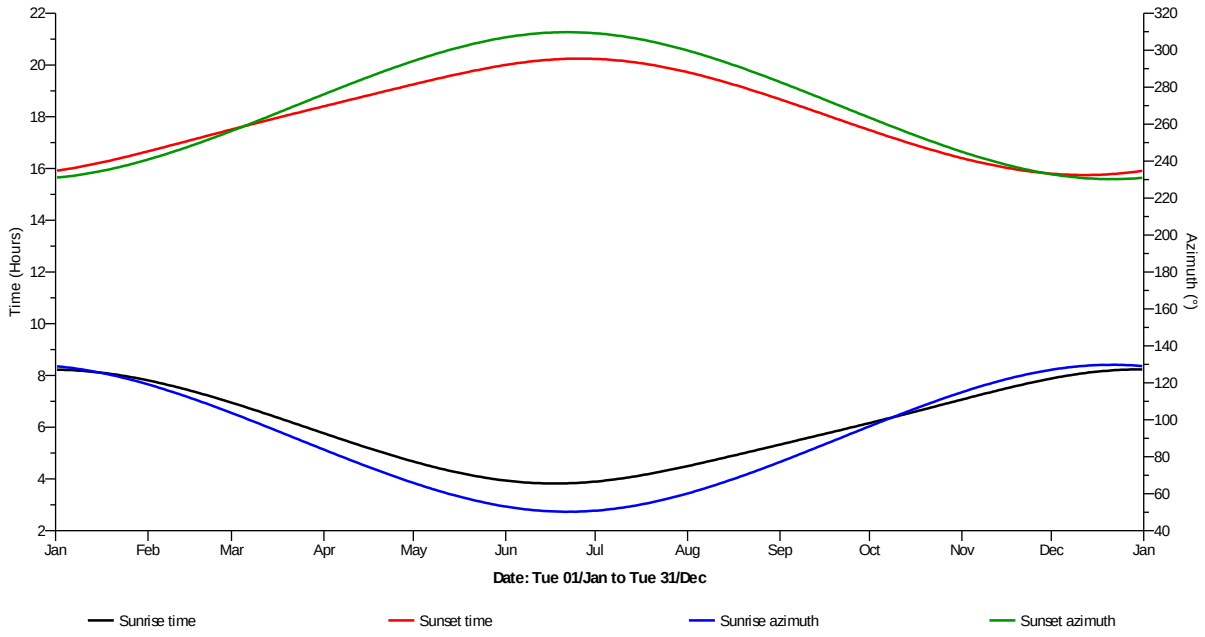
6.2. No-Sky Line

This report demonstrates that the No-Sky Line criteria are met on 80% of the rooms. These rooms (R13, R14, R15, R16, R17, R18) are located on the ground floor and will not meet the NSL factor due to the higher obstruction angle. However, the percentage of No-Sky Line for these rooms is not considered of concern as the ADFs are met and will provide adequate levels of daylight for the rooms.

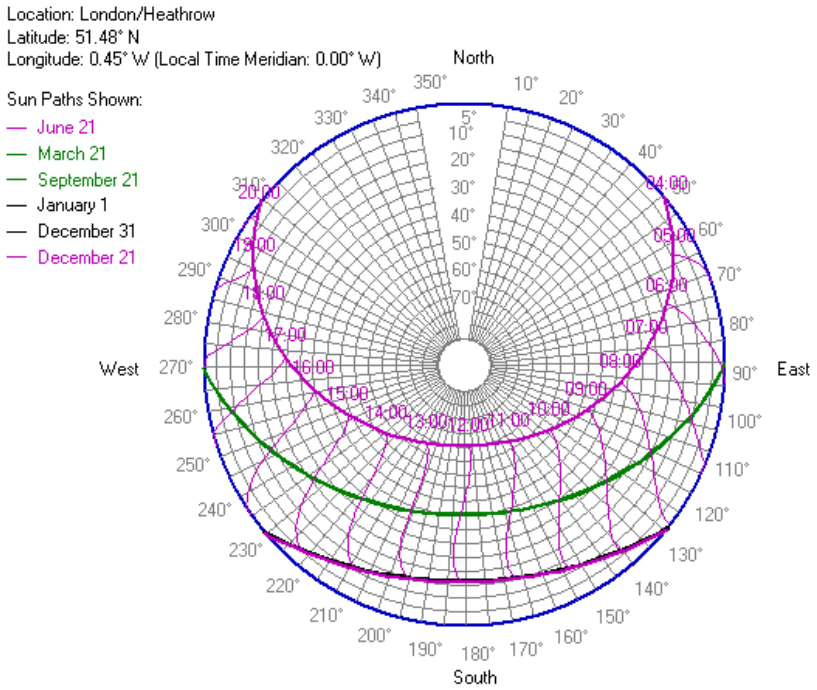
On balance the proposed development will provide good residential accommodations which will enjoy good levels of daylight.

7 APPENDIX

7.1. Sunrise and sunset time

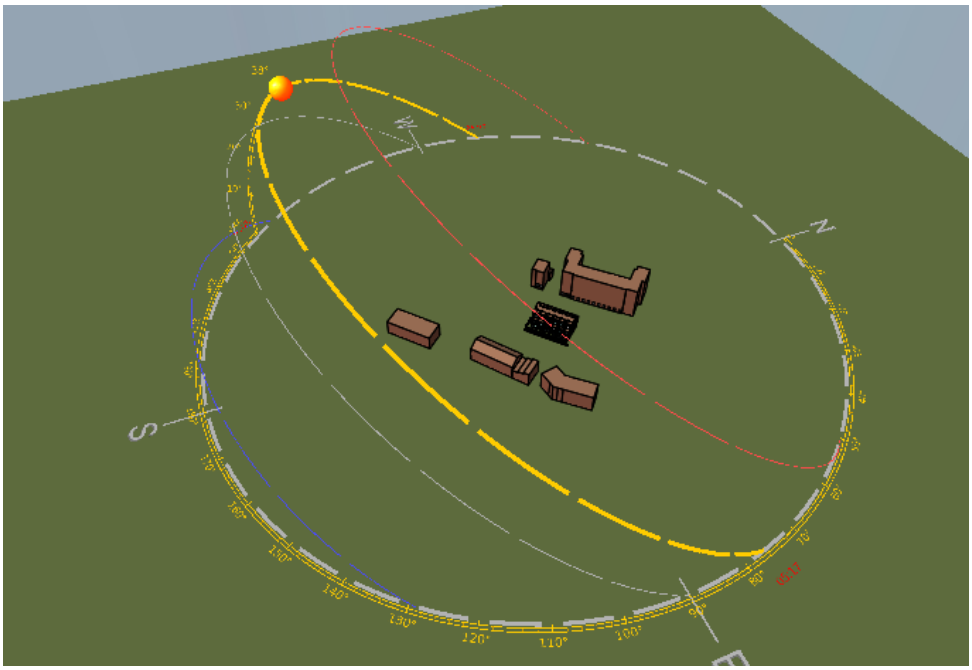


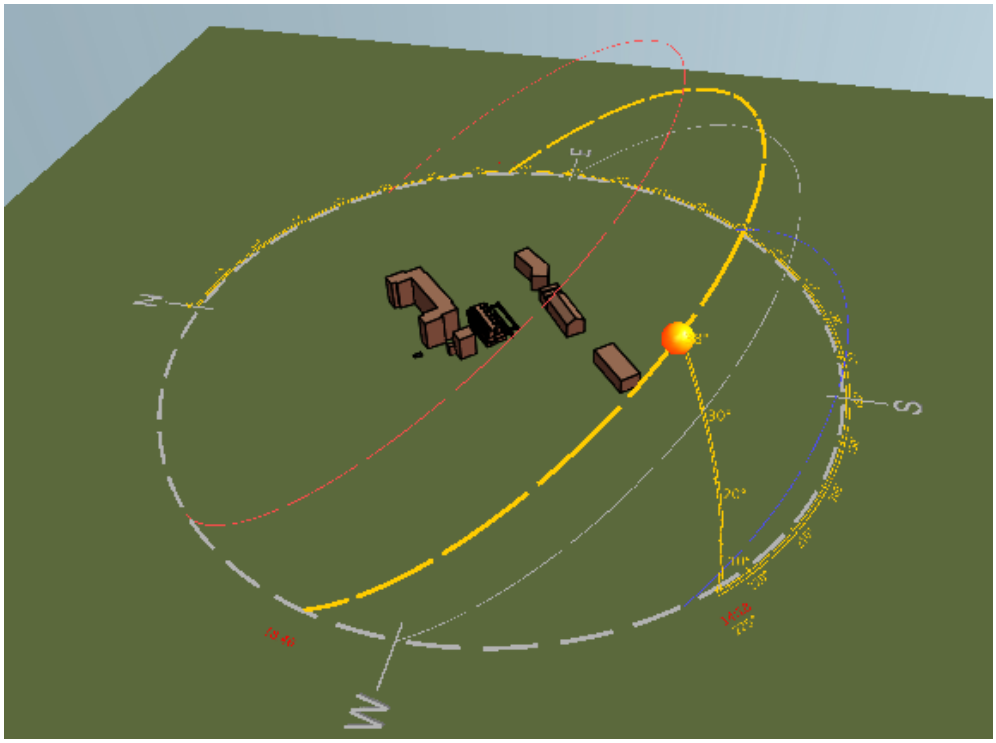
7.2. Sun path



7.3. Suntrace

- The red line represents the sun's path during June.
- The yellow line represents the sun's path during March/September.
- The blue line represents the sun's path during December.

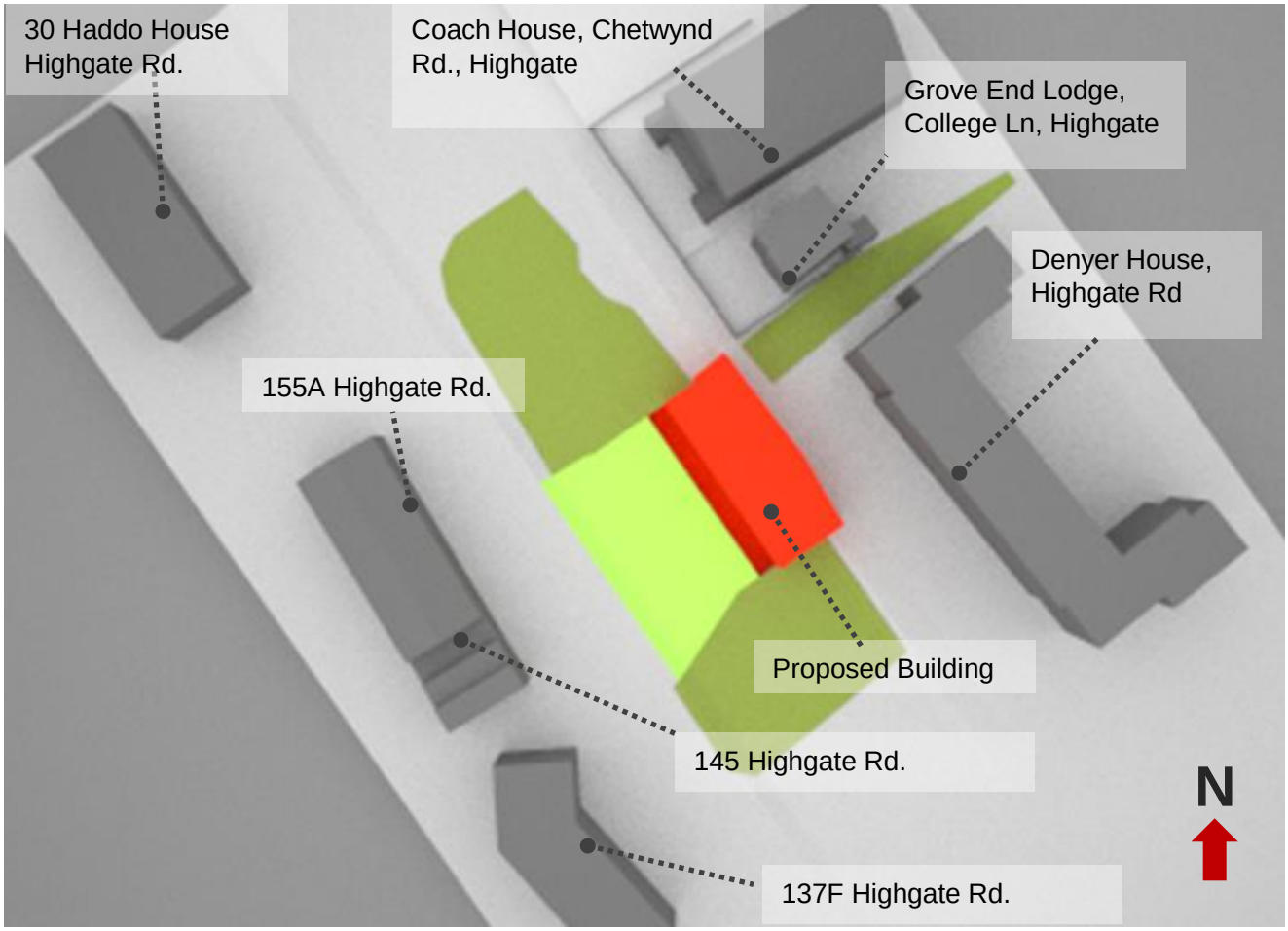




7.4. Site plan and location

Location	138-140 Highgate Road, Highgate, London NW5 1PB
Latitude (°)	51.56 N
Longitude (°)	0.14 W

7.4.1. Site Plans

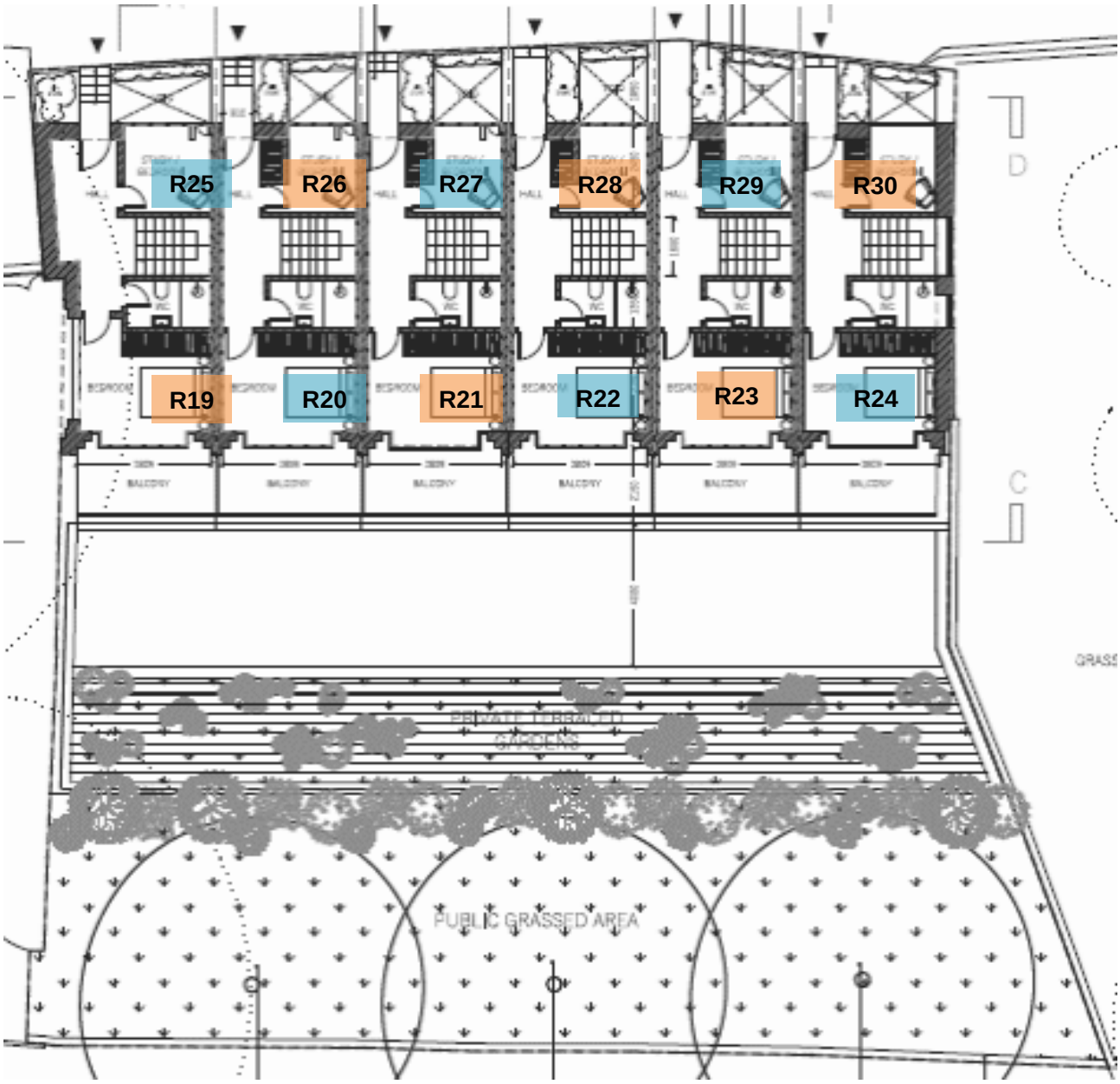


Proposed site layout

7.4.2. Location of Assessed Rooms

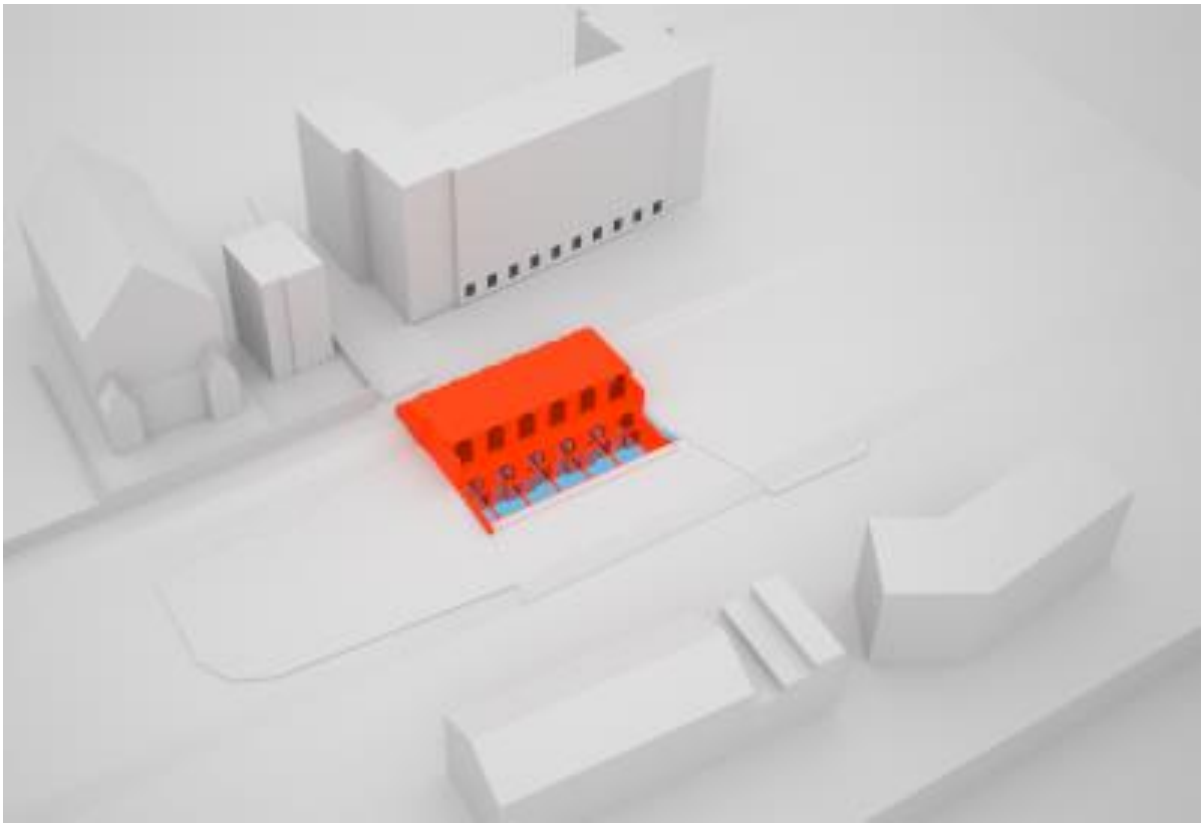
Proposed Lower Ground Floor Plan

Proposed Ground Floor Plan



Proposed Upper Ground Floor Plan

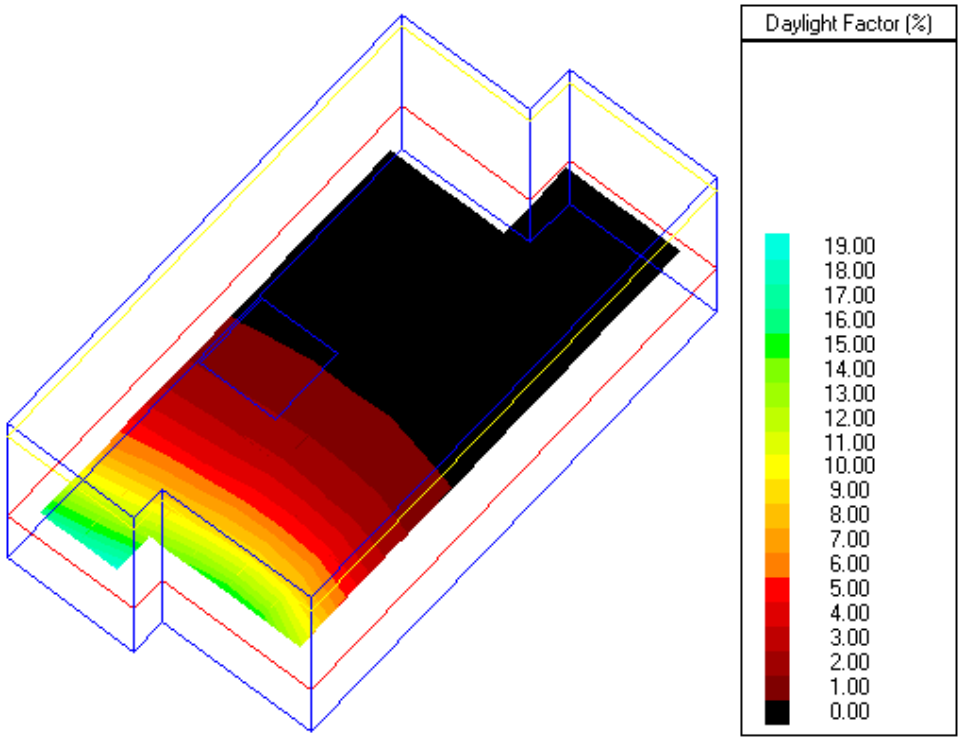
7.5. Model images



Proposed - model image

7.6. ADF and No-Sky Line results

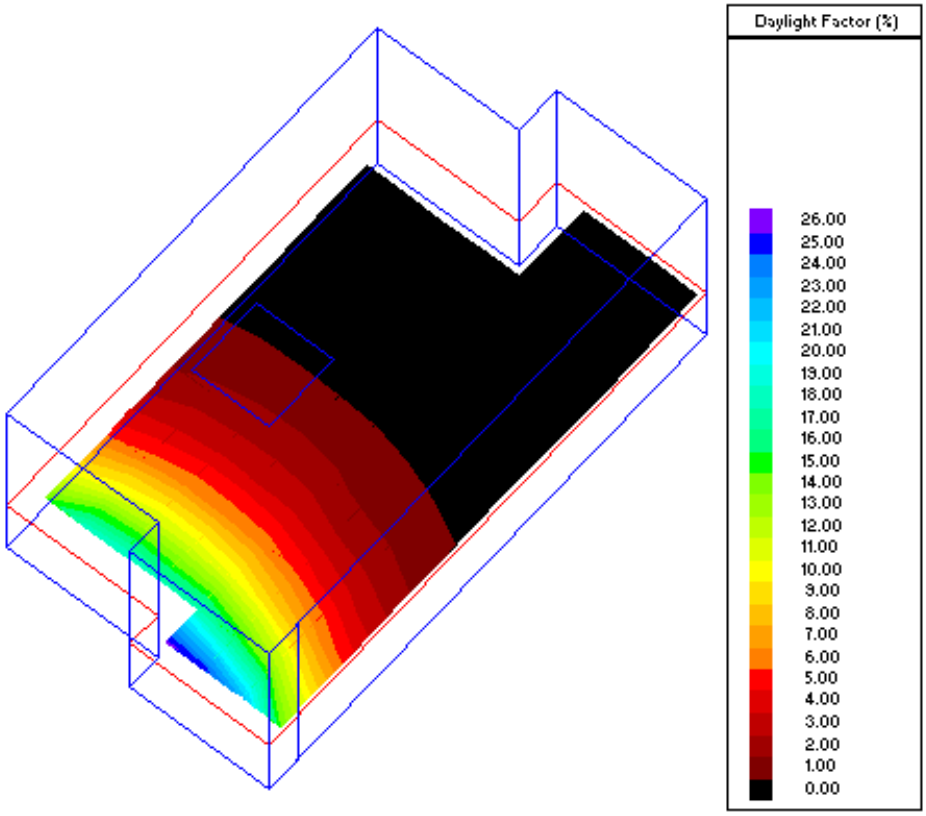
R01 Kitchen/ Living room - LGF



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=41.413m² Margin=0.00 m	Daylight factor	0.0 %	3.3 %	19.2 %	0.00	0.00
	Daylight illuminance	1.73 lux	403.81 lux	2339.94 lux	0.00	0.00
	Sky view	0.00	0.83	1.00	0.00	0.00

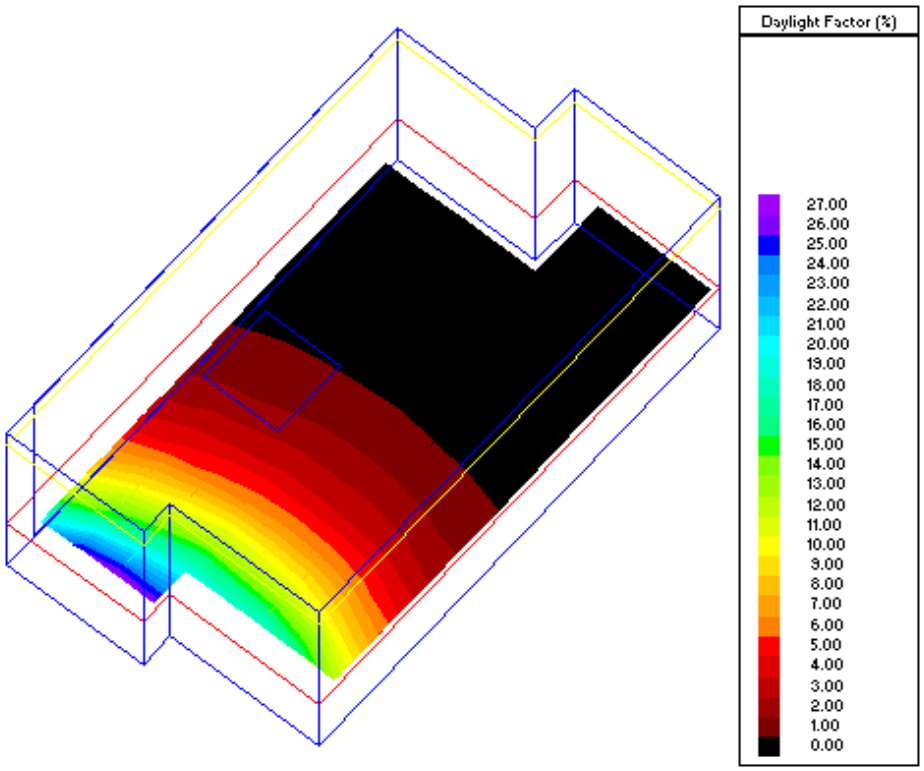
R02 Kitchen/ Living room - LGF



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=13.068m² Margin=0.00 m	Daylight factor	0.0 %	4.0 %	26.2 %	0.00	0.00
	Daylight illuminance	1.56 lux	489.74 lux	3206.00 lux	0.00	0.00
	Sky view	0.00	0.83	1.00	0.00	0.00

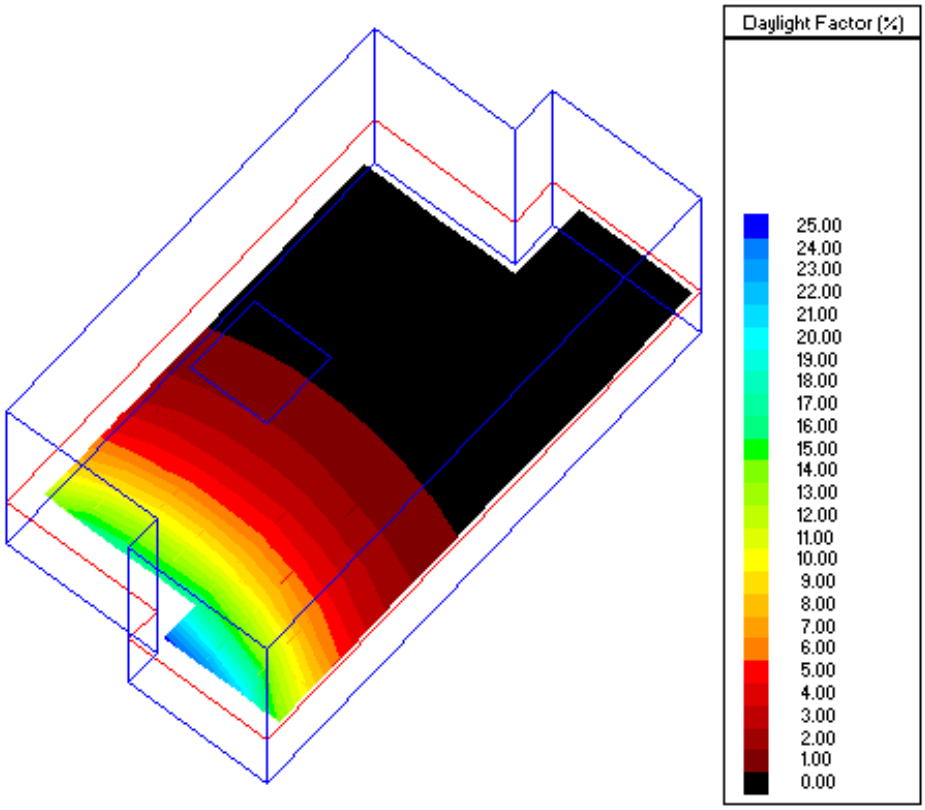
R03 Kitchen/ Living room - LGF



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=14.861m² Margin=0.00 m	Daylight factor	0.0 %	4.3 %	27.2 %	0.01	0.00
	Daylight illuminance	2.67 lux	527.94 lux	3325.66 lux	0.01	0.00
	Sky view	0.00	0.85	1.00	0.00	0.00

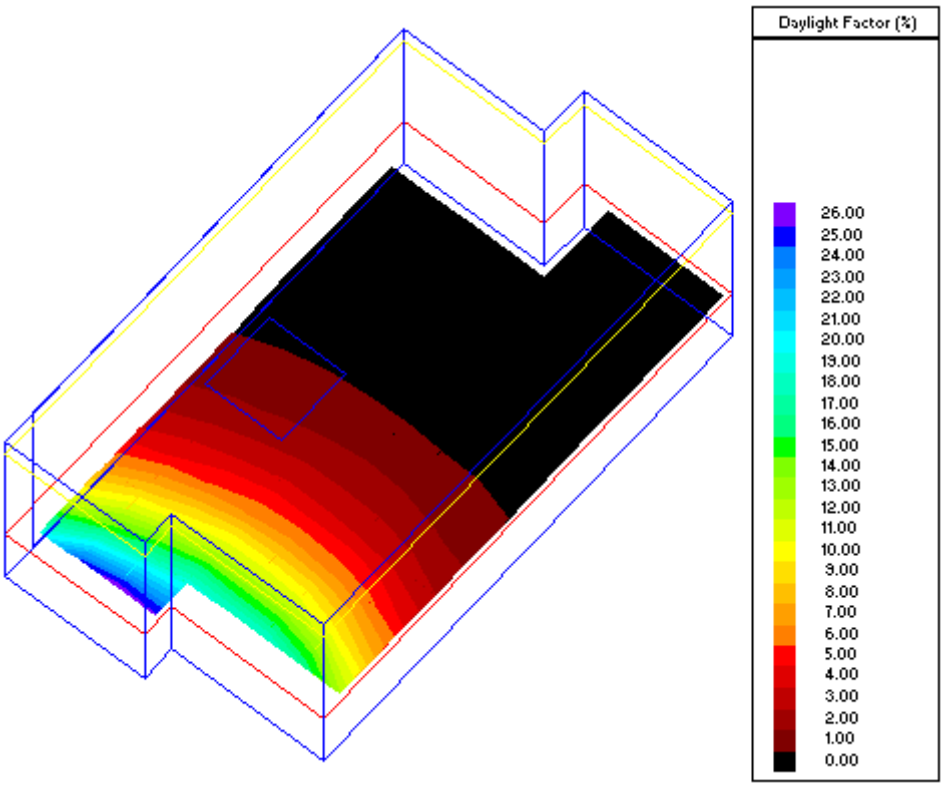
R04 Kitchen/ Living room - LGF



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=18.973m² Margin=0.00 m	Daylight factor	0.0 %	3.8 %	25.3 %	0.00	0.00
	Daylight illuminance	1.41 lux	461.15 lux	3096.19 lux	0.00	0.00
	Sky view	0.00	0.85	1.00	0.00	0.00

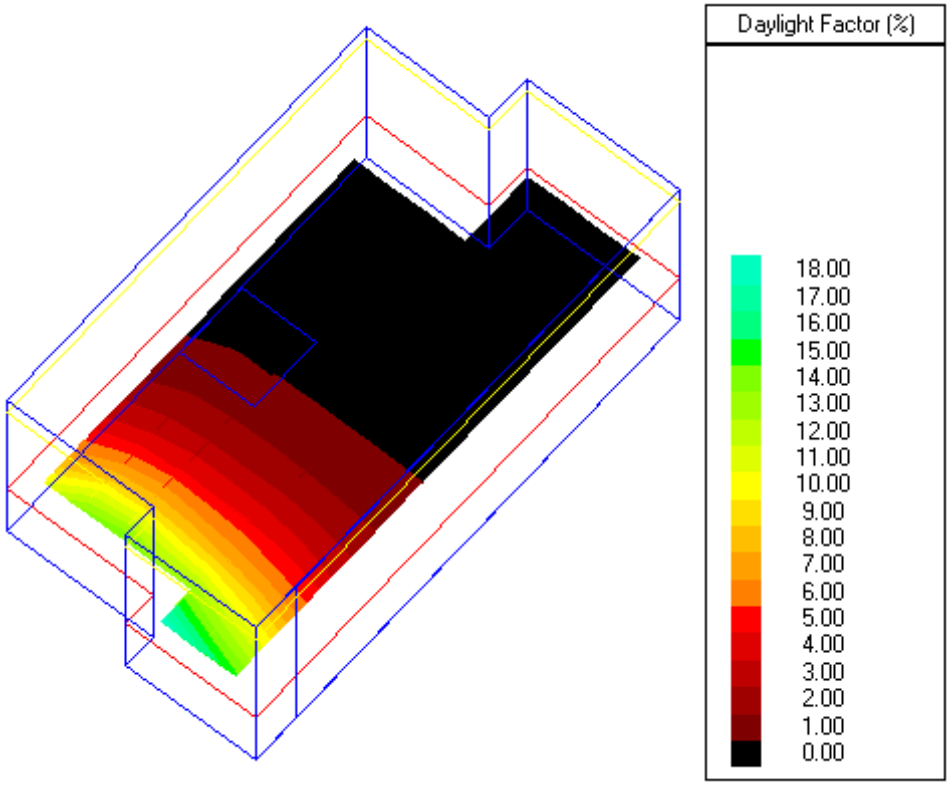
R05 Kitchen/ Living room - LGF



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=8.998m² Margin=0.00 m	Daylight factor	0.0 %	4.2 %	26.6 %	0.01	0.00
	Daylight illuminance	2.63 lux	518.21 lux	3254.24 lux	0.01	0.00
	Sky view	0.00	0.85	1.00	0.00	0.00

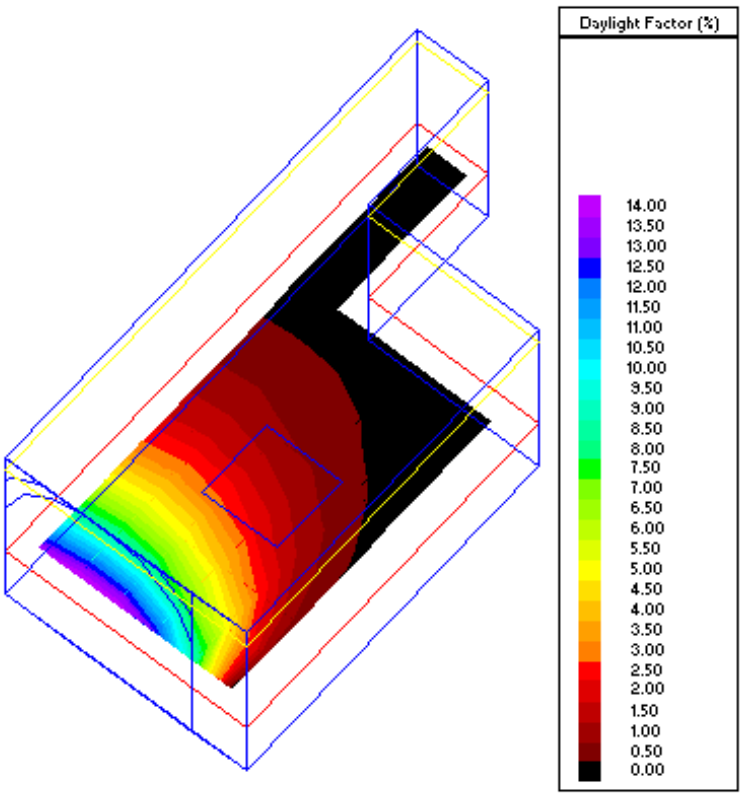
R06 Kitchen/ Living room - LGF



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=42.514m² Margin=0.00 m	Daylight factor	0.0 %	3.1 %	18.9 %	0.01	0.00
	Daylight illuminance	3.10 lux	378.56 lux	2307.18 lux	0.01	0.00
	Sky view	0.00	0.83	1.00	0.00	0.00

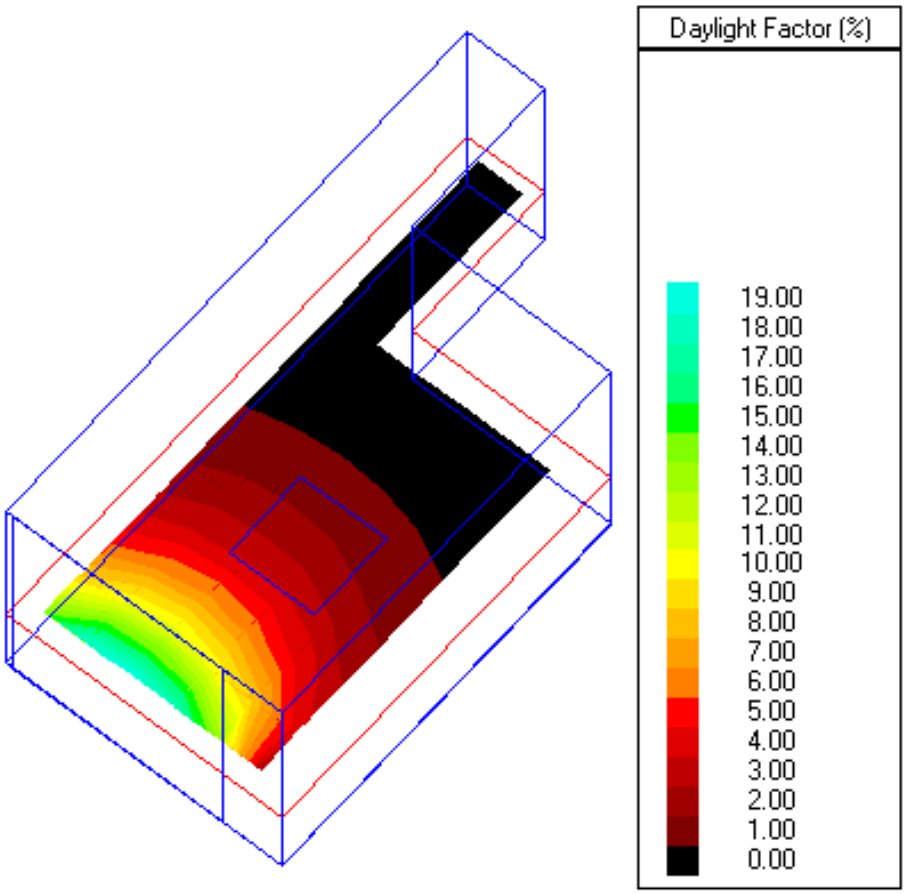
R07 Bedroom - GF



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=14.560m² Margin=0.00 m	Daylight factor	0.0 %	2.7 %	14.5 %	0.01	0.00
	Daylight illuminance	2.57 lux	329.40 lux	1769.82 lux	0.01	0.00
	Sky view	0.00	0.98	1.00	0.00	0.00

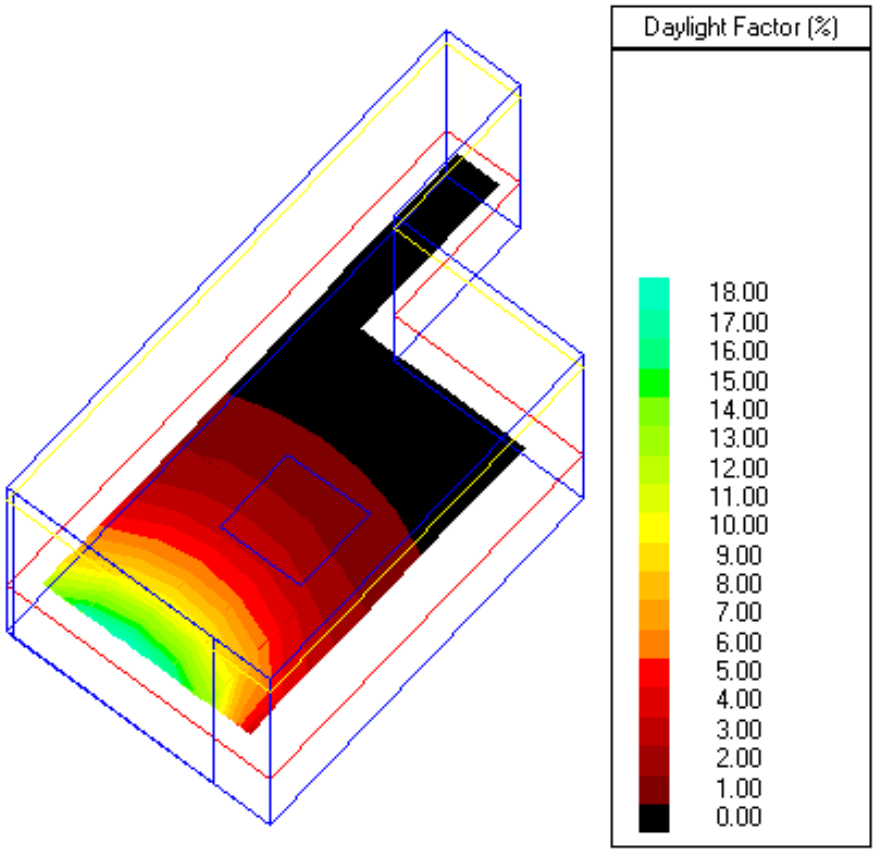
R08 Bedroom - GF



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=14.244m² Margin=0.00 m	Daylight factor	0.0 %	3.7 %	19.5 %	0.01	0.00
	Daylight illuminance	2.71 lux	453.42 lux	2379.88 lux	0.01	0.00
	Sky view	0.00	0.98	1.00	0.00	0.00

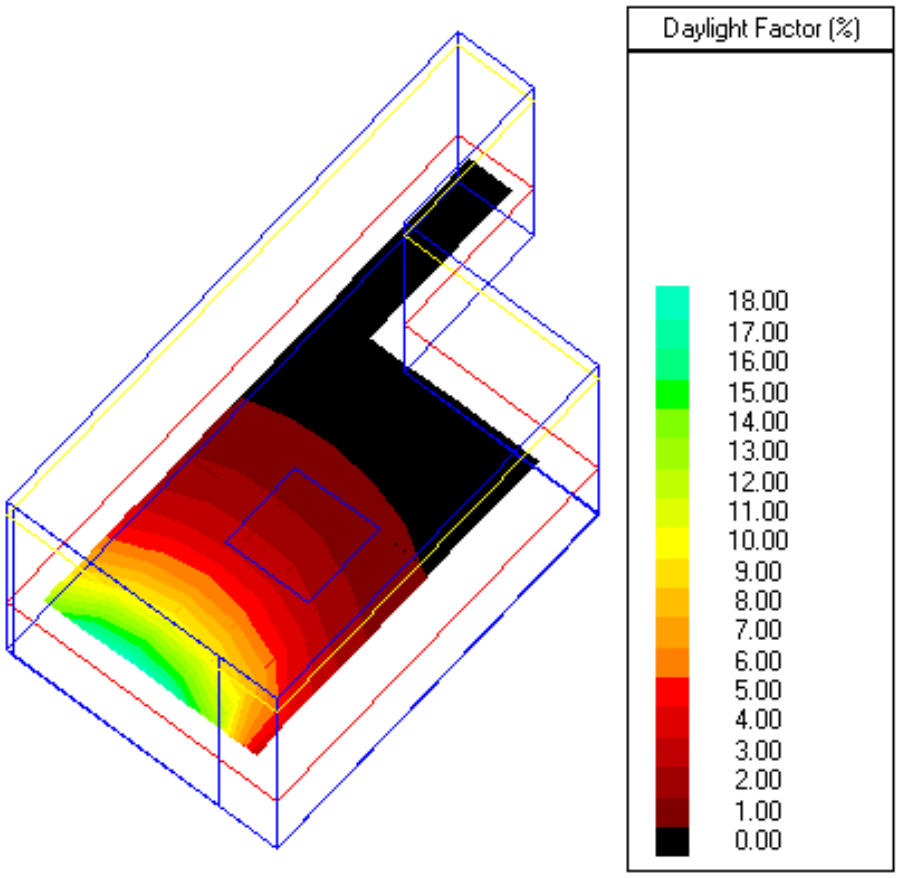
R09 Bedroom - GF



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=30.947m² Margin=0.00 m	Daylight factor	0.1 %	3.5 %	18.4 %	0.02	0.00
	Daylight illuminance	7.37 lux	427.09 lux	2251.33 lux	0.02	0.00
	Sky view	1.00	1.00	1.00	1.00	1.00

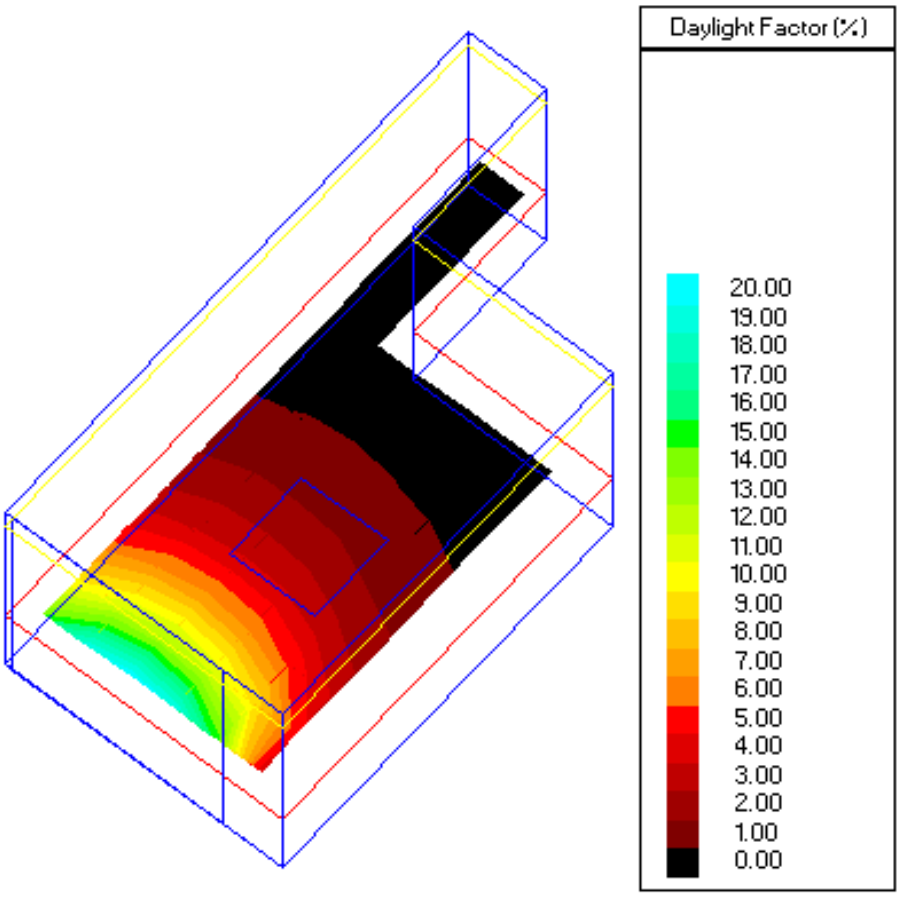
R10 Bedroom - GF



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=12.188m² Margin=0.00 m	Daylight factor	0.2 %	3.6 %	18.6 %	0.06	0.01
	Daylight illuminance	24.49 lux	439.49 lux	2274.13 lux	0.06	0.01
	Sky view	1.00	1.00	1.00	1.00	1.00

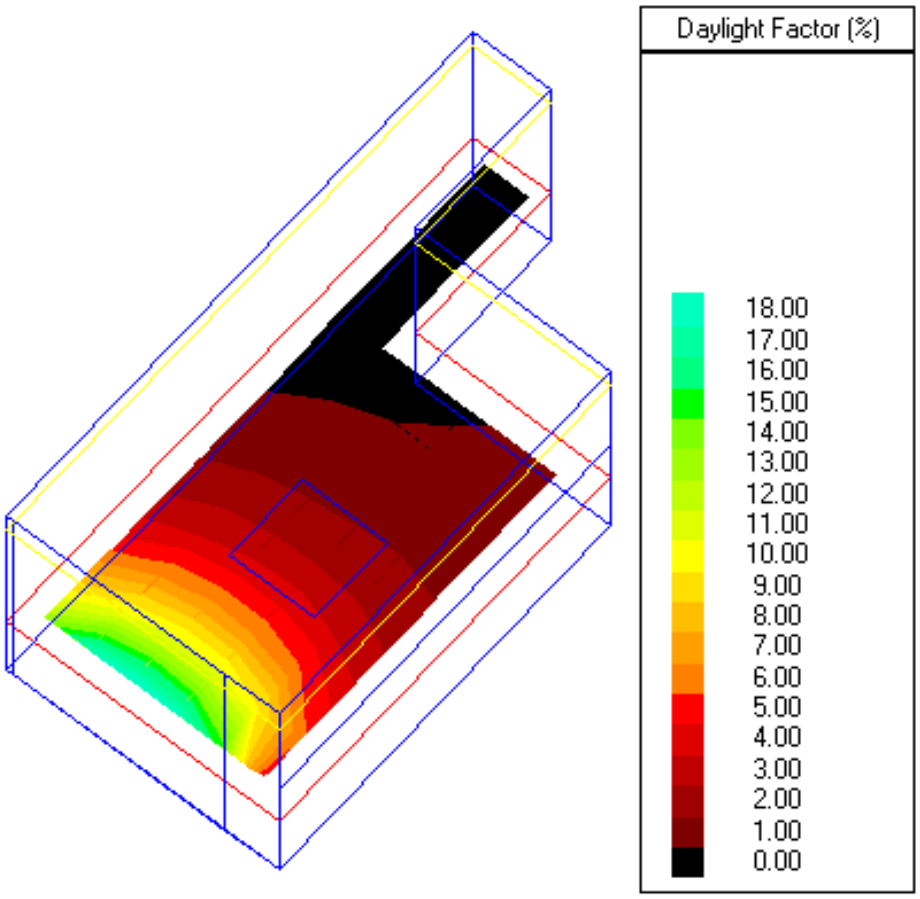
R11 Bedroom - GF



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=12.409m² Margin=0.00 m	Daylight factor	0.3 %	4.1 %	20.7 %	0.06	0.01
	Daylight illuminance	30.92 lux	495.11 lux	2525.39 lux	0.06	0.01
	Sky view	1.00	1.00	1.00	1.00	1.00

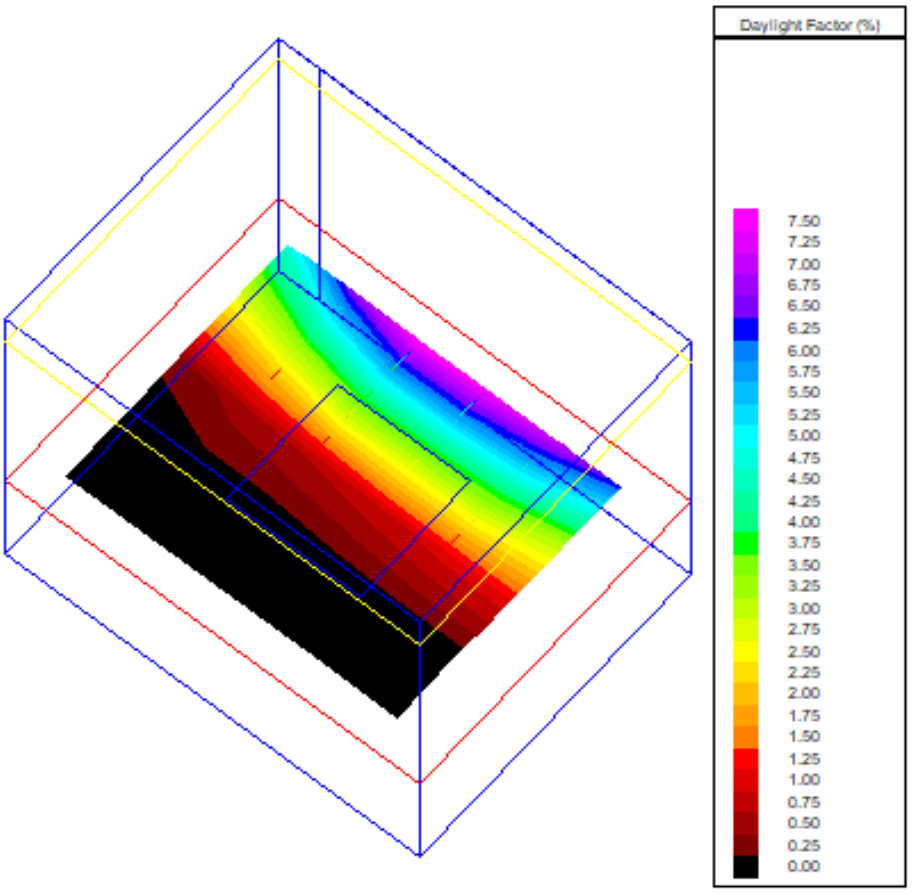
R12 Bedroom - GF



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=15.098m² Margin=0.00 m	Daylight factor	0.3 %	4.1 %	18.9 %	0.07	0.01
	Daylight illuminance	33.99 lux	505.39 lux	2306.66 lux	0.07	0.01
	Sky view	1.00	1.00	1.00	1.00	1.00

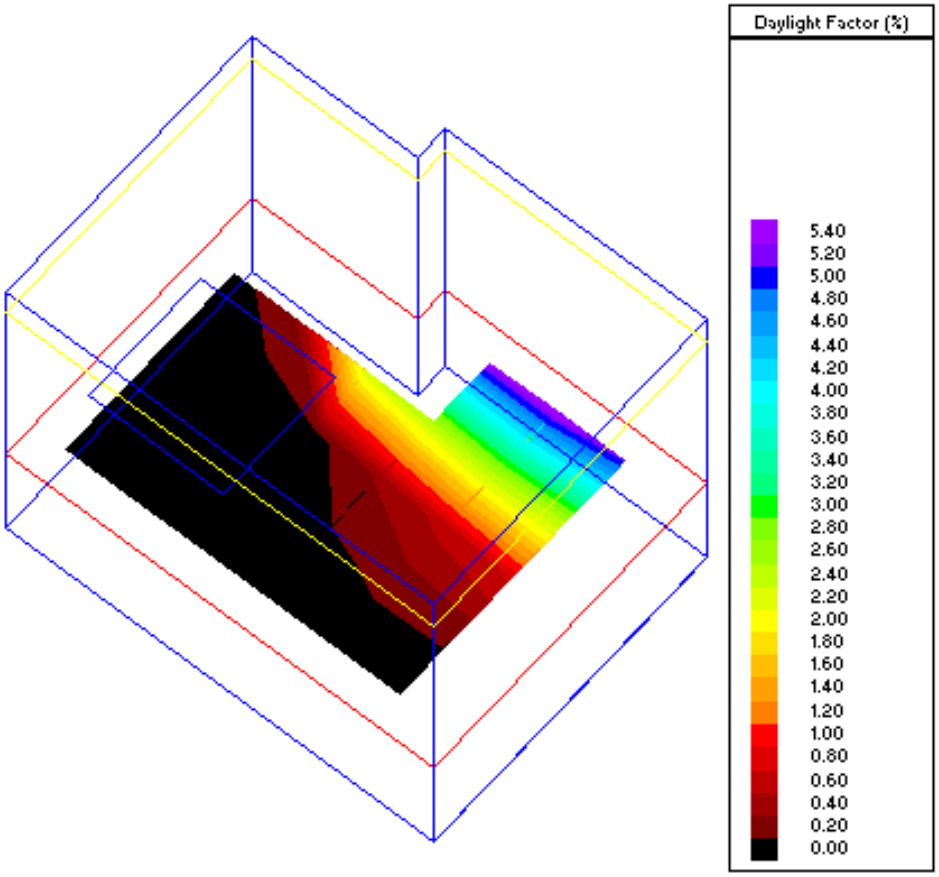
R13 Bedroom - GF



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=12.040m² Margin=0.00 m	Daylight factor	0.0 %	2.2 %	7.7 %	0.06	0.01
	Daylight illuminance	3.02 lux	269.77 lux	941.84 lux	0.01	0.00
	Sky view	0.00	0.63	1.00	0.00	0.00

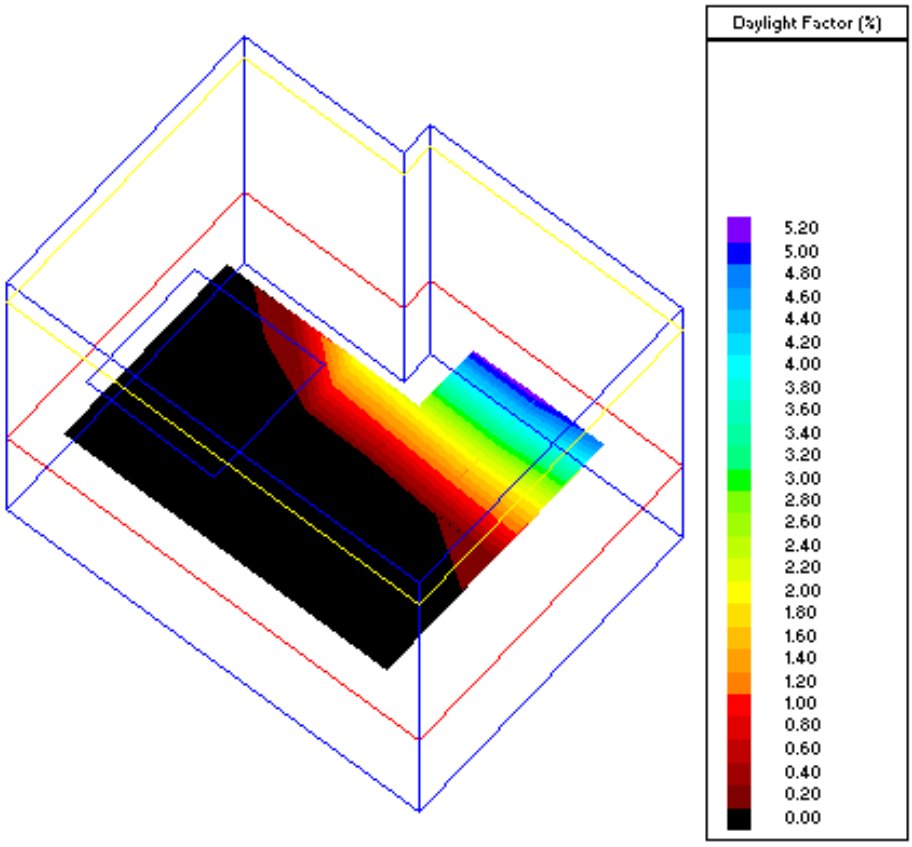
R14 Bedroom - GF



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=28.444m² Margin=0.00 m	Daylight factor	0.0 %	1.1 %	5.5 %	0.03	0.01
	Daylight illuminance	3.64 lux	137.37 lux	675.09 lux	0.03	0.01
	Sky view	0.00	0.67	1.00	0.00	0.00

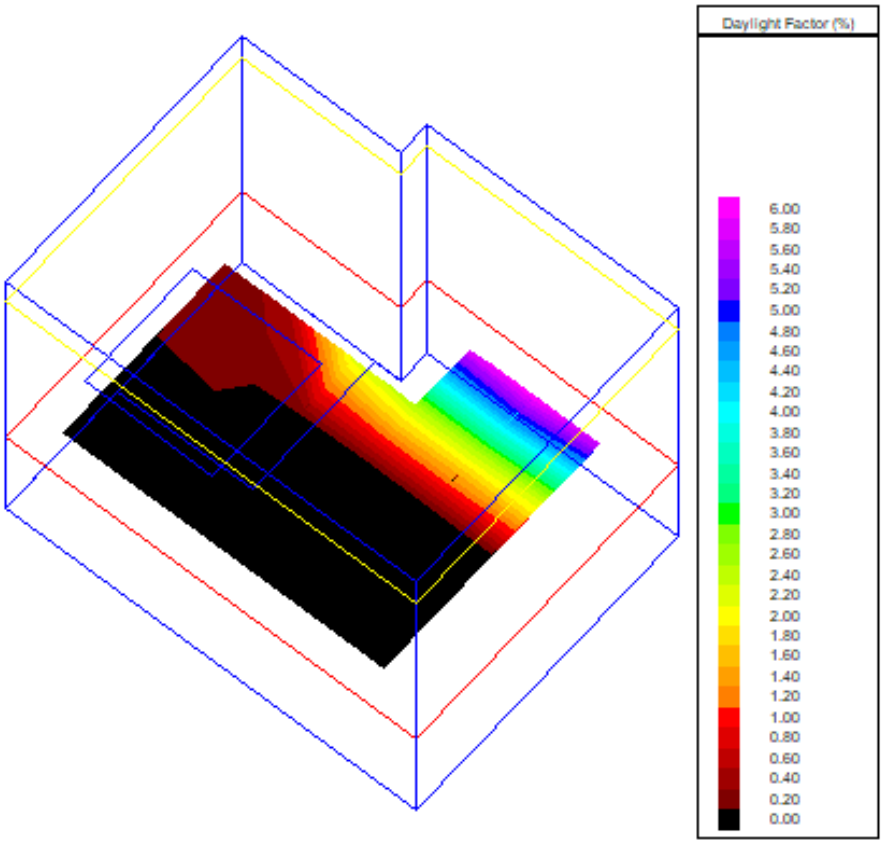
R15 Bedroom - GF



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=15.516m² Margin=0.00 m	Daylight factor	0.0 %	1.0 %	5.3 %	0.02	0.00
	Daylight illuminance	1.92 lux	117.55 lux	645.45 lux	0.02	0.00
	Sky view	0.00	0.48	1.00	0.00	0.00

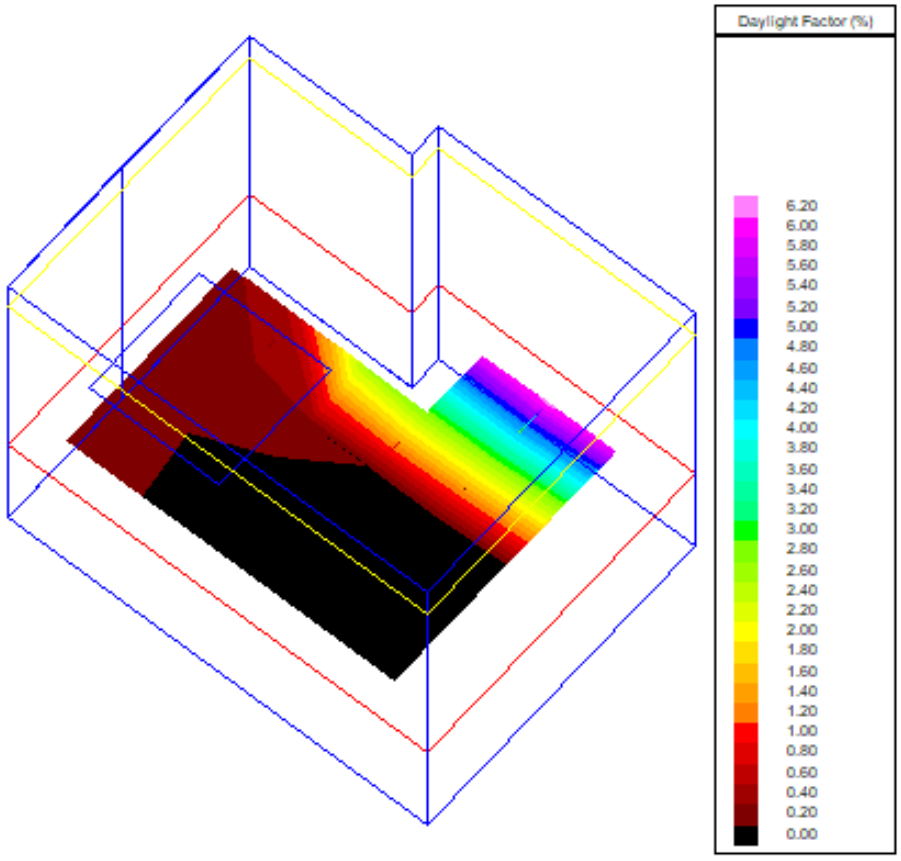
R16 Bedroom - GF



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=29.863m² Margin=0.00 m	Daylight factor	0.1 %	1.2 %	6.1 %	0.08	0.01
	Daylight illuminance	10.95 lux	140.83 lux	749.76 lux	0.08	0.01
	Sky view	0.00	0.48	1.00	0.00	0.00

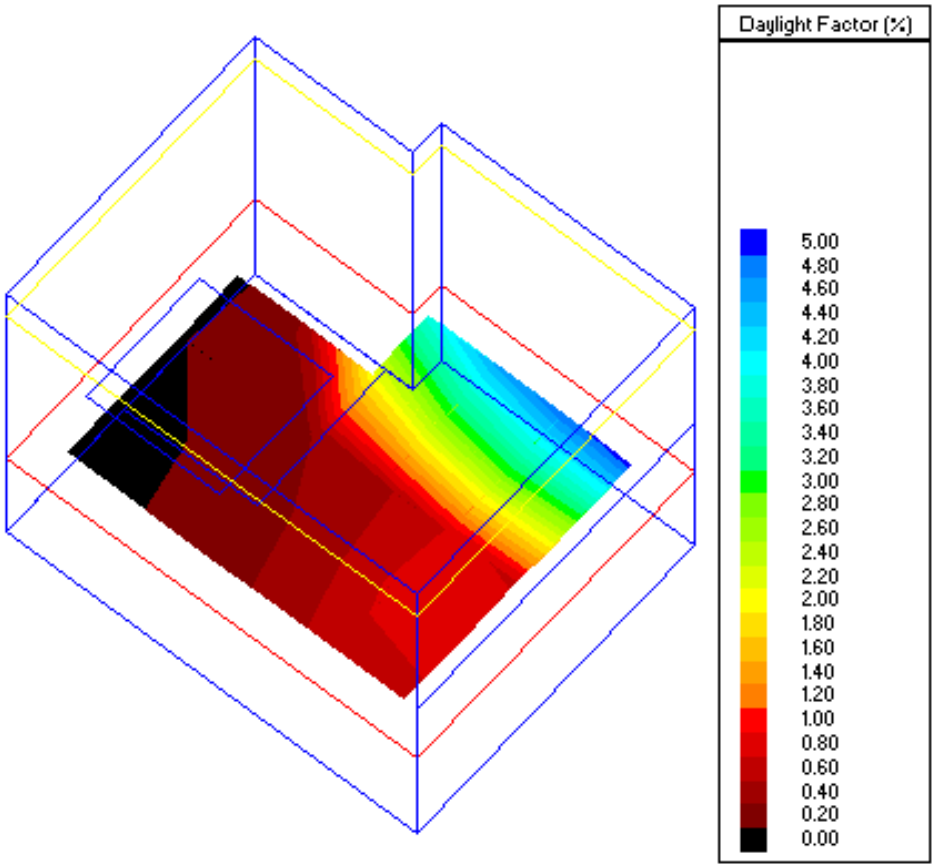
R17 Bedroom - GF



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=16.504m² Margin=0.00 m	Daylight factor	0.1 %	1.2 %	6.2 %	0.07	0.01
	Daylight illuminance	10.62 lux	151.16 lux	759.95 lux	0.07	0.01
	Sky view	0.00	0.52	1.00	0.00	0.00

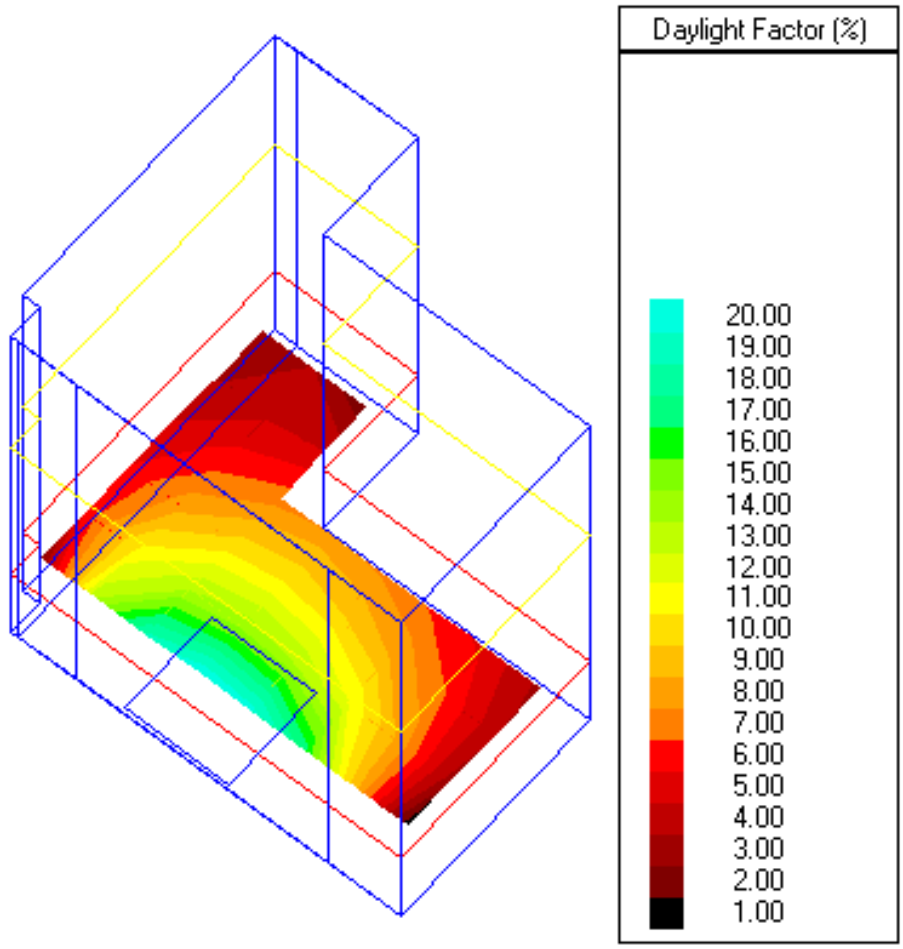
R18 Bedroom - GF



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=32.503m² Margin=0.00 m	Daylight factor	0.1 %	1.4 %	5.1 %	0.11	0.03
	Daylight illuminance	17.68 lux	167.10 lux	625.61 lux	0.11	0.03
	Sky view	0.00	0.50	1.00	0.00	0.00

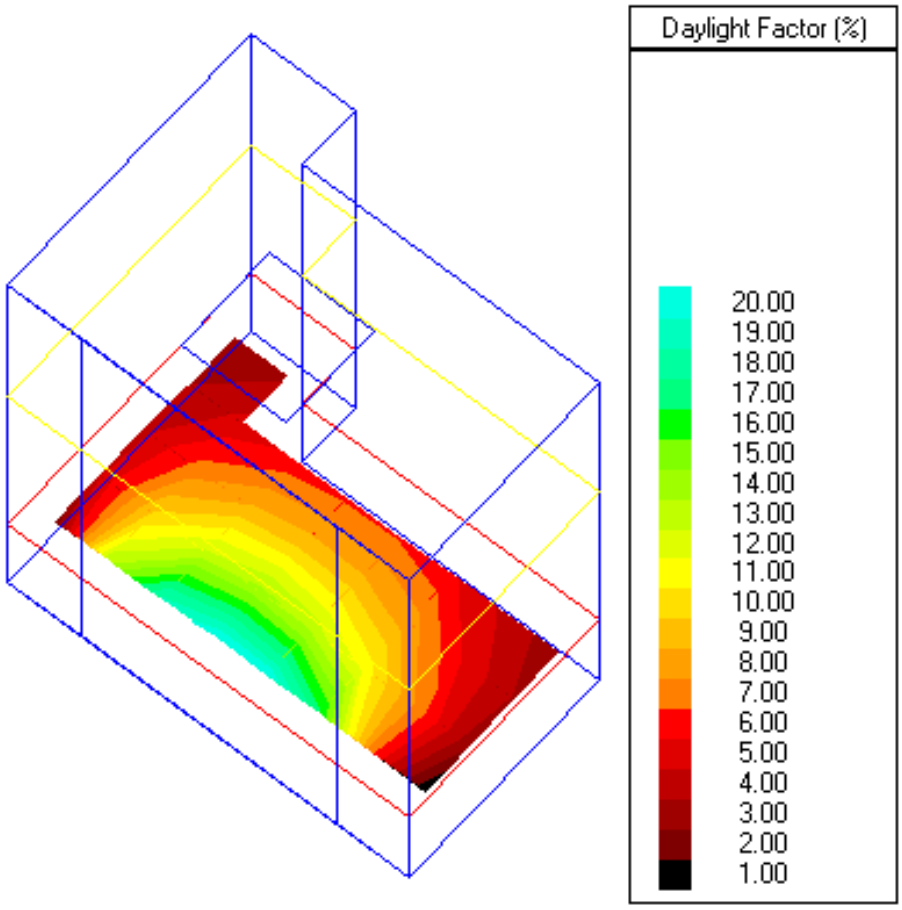
R19 Bedroom - UGF



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=9.520m² Margin=0.00 m	Daylight factor	1.4 %	8.7 %	20.7 %	0.16	0.07
	Daylight illuminance	167.33 lux	1057.90 lux	2530.84 lux	0.16	0.07
	Sky view	1.00	1.00	1.00	1.00	1.00

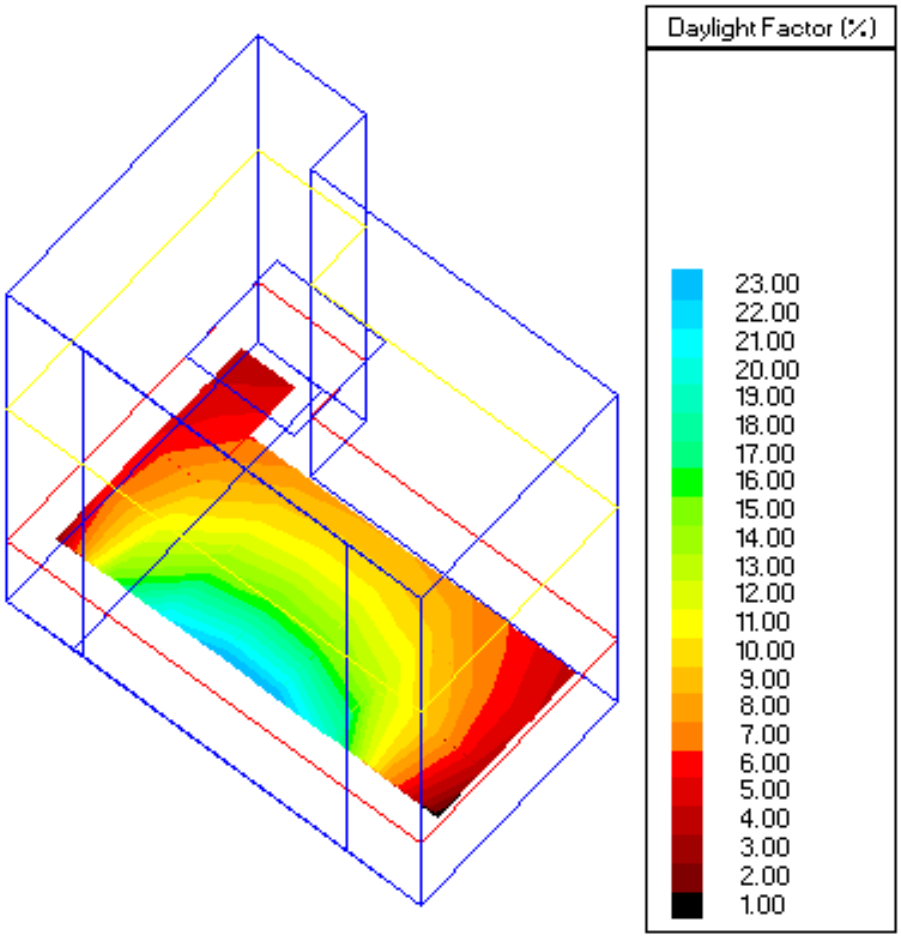
R20 Bedroom - UGF



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=12.980m² Margin=0.00 m	Daylight factor	1.0 %	8.5 %	20.7 %	0.12	0.05
	Daylight illuminance	125.45 lux	1033.95 lux	2524.77 lux	0.12	0.05
	Sky view	1.00	1.00	1.00	1.00	1.00

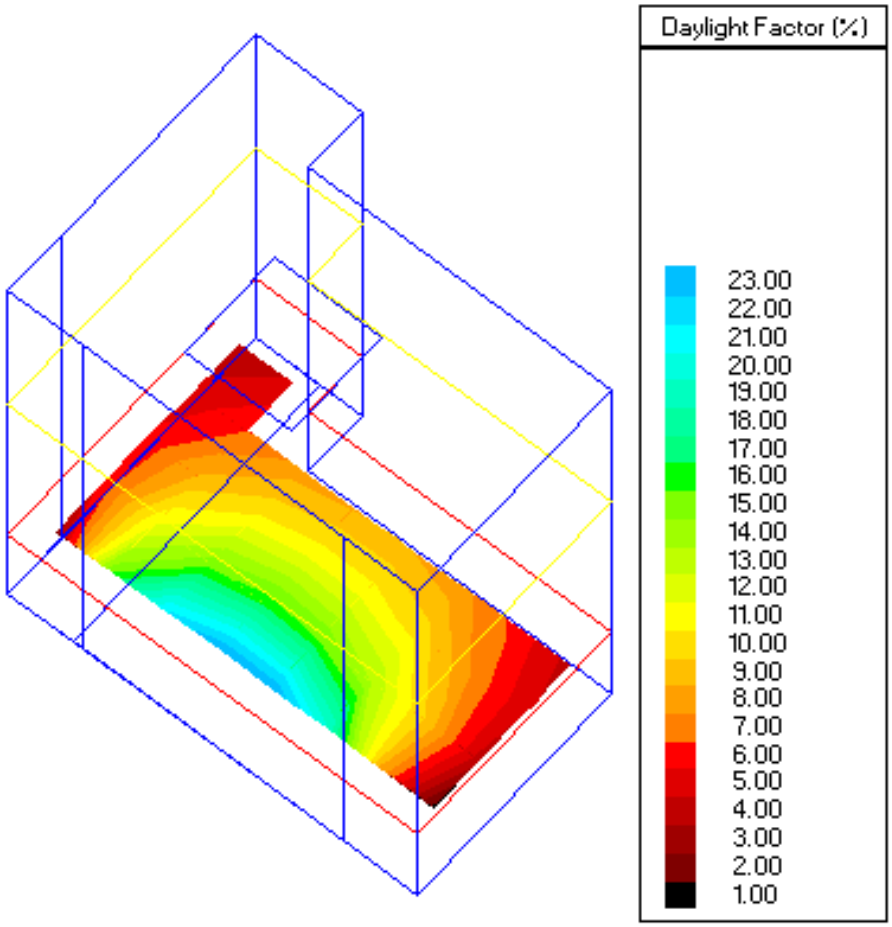
R21 Bedroom - UGF



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=28.992m² Margin=0.00 m	Daylight factor	1.5 %	10.3 %	23.8 %	0.15	0.06
	Daylight illuminance	188.08 lux	1259.85 lux	2901.97 lux	0.15	0.06
	Sky view	1.00	1.00	1.00	1.00	1.00

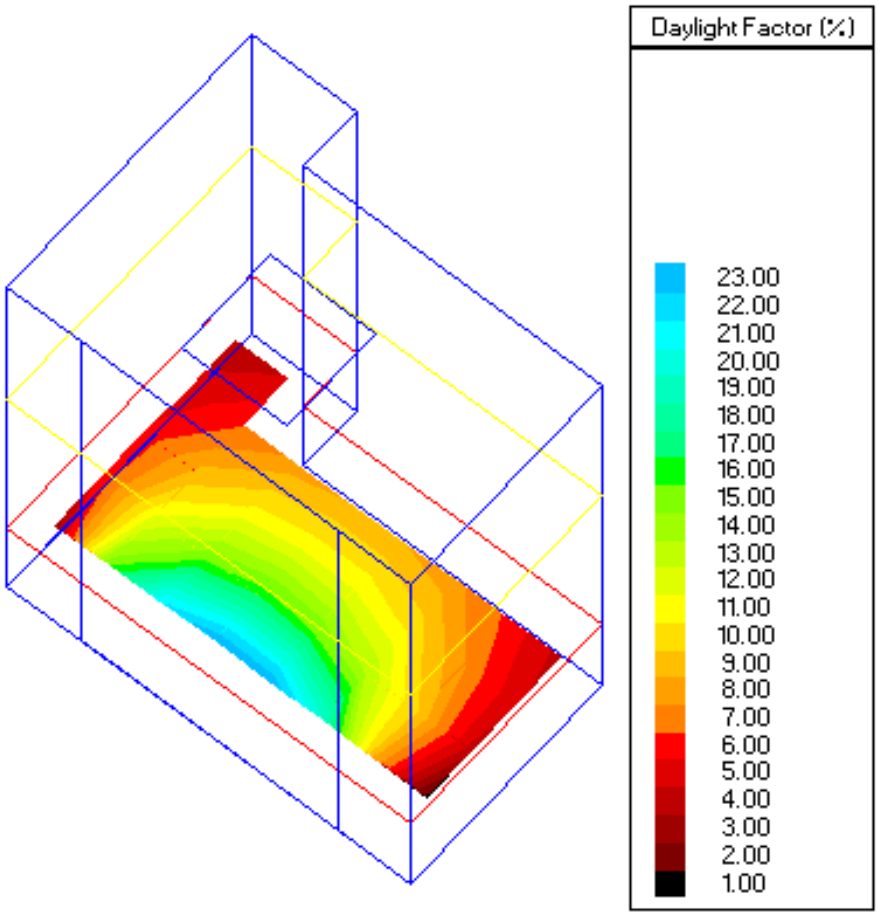
R22 Bedroom - UGF



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=13.433m² Margin=0.00 m	Daylight factor	1.7 %	10.4 %	23.8 %	0.16	0.07
	Daylight illuminance	206.87 lux	1272.17 lux	2913.23 lux	0.16	0.07
	Sky view	1.00	1.00	1.00	1.00	1.00

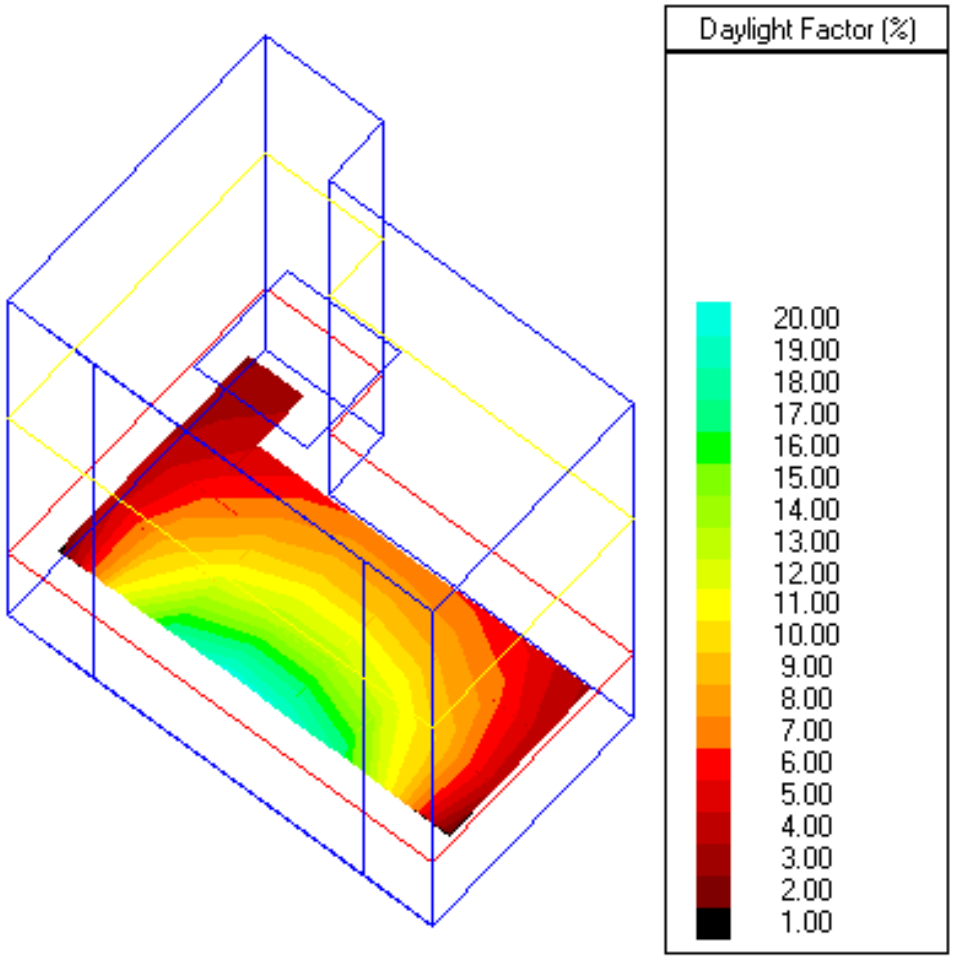
R23 Bedroom - UGF



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=13.918m² Margin=0.00 m	Daylight factor	1.7 %	10.4 %	23.9 %	0.16	0.07
	Daylight illuminance	207.00 lux	1274.41 lux	2916.69 lux	0.16	0.07
	Sky view	1.00	1.00	1.00	1.00	1.00

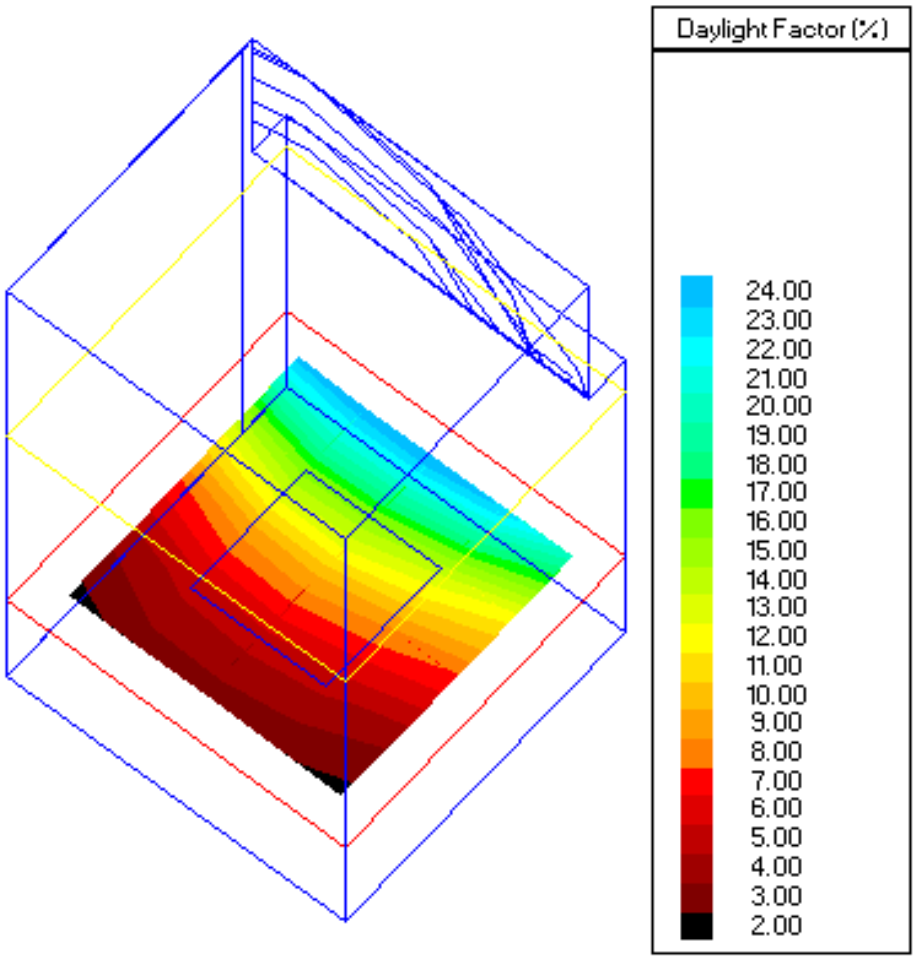
R24 Bedroom - UGF



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=28.524m² Margin=0.00 m	Daylight factor	1.4 %	8.6 %	20.3 %	0.16	0.07
	Daylight illuminance	172.09 lux	1053.18 lux	2484.38 lux	0.16	0.07
	Sky view	1.00	1.00	1.00	1.00	1.00

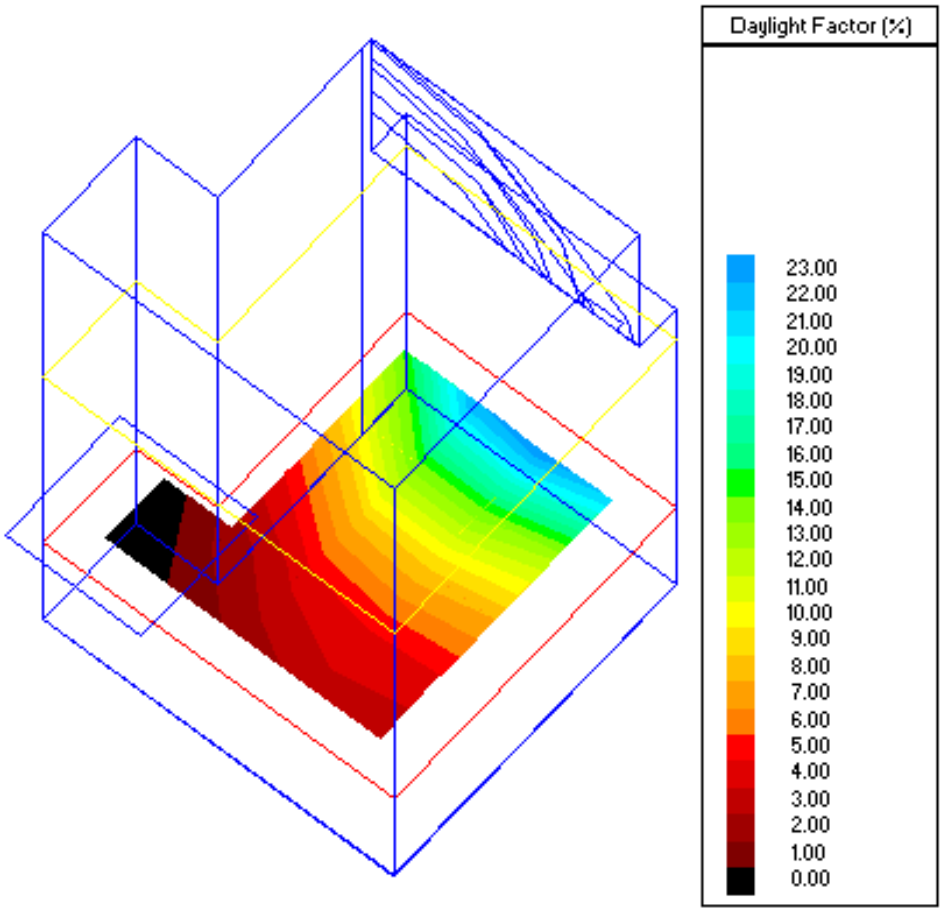
R25 Bedroom - UGF



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=13.440m² Margin=0.00 m	Daylight factor	2.5 %	11.1 %	24.9 %	0.23	0.10
	Daylight illuminance	309.43 lux	1360.93 lux	3048.10 lux	0.23	0.10
	Sky view	1.00	1.00	1.00	1.00	1.00

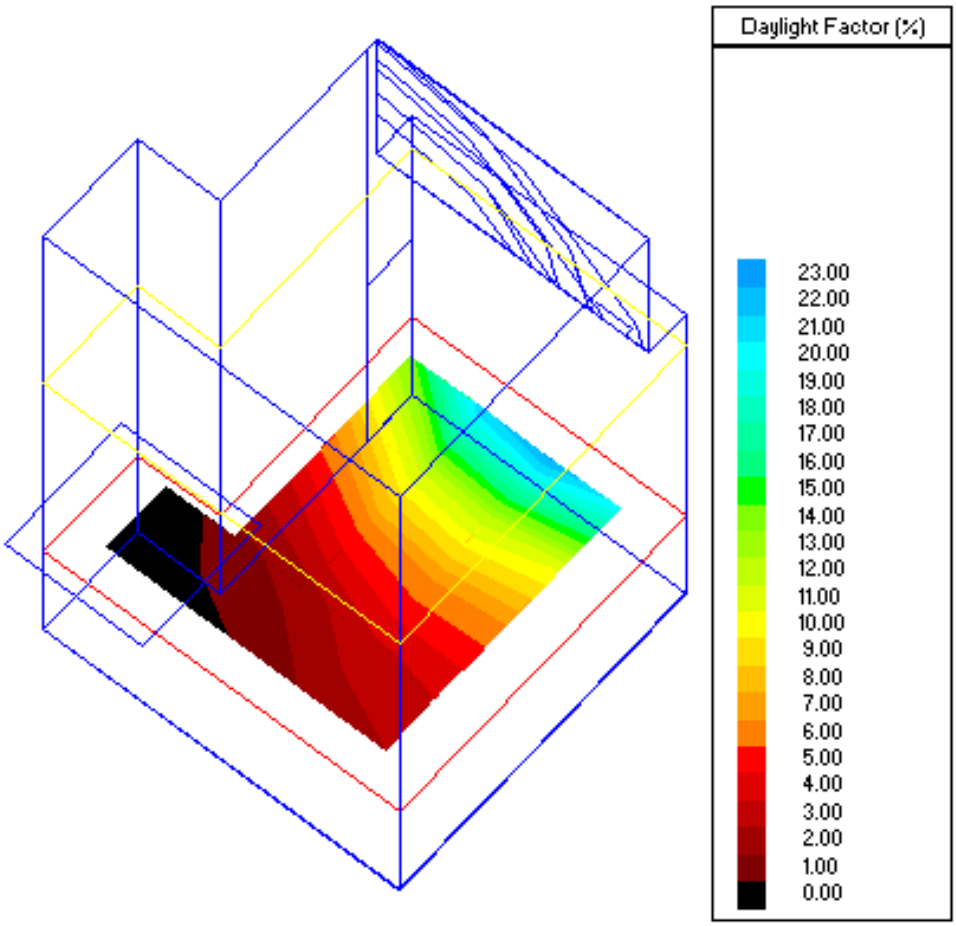
R26 Bedroom - UGF



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=23.677m² Margin=0.00 m	Daylight factor	0.3 %	8.8 %	24.0 %	0.03	0.01
	Daylight illuminance	35.22 lux	1072.72 lux	2928.59 lux	0.03	0.01
	Sky view	0.00	0.91	1.00	0.00	0.00

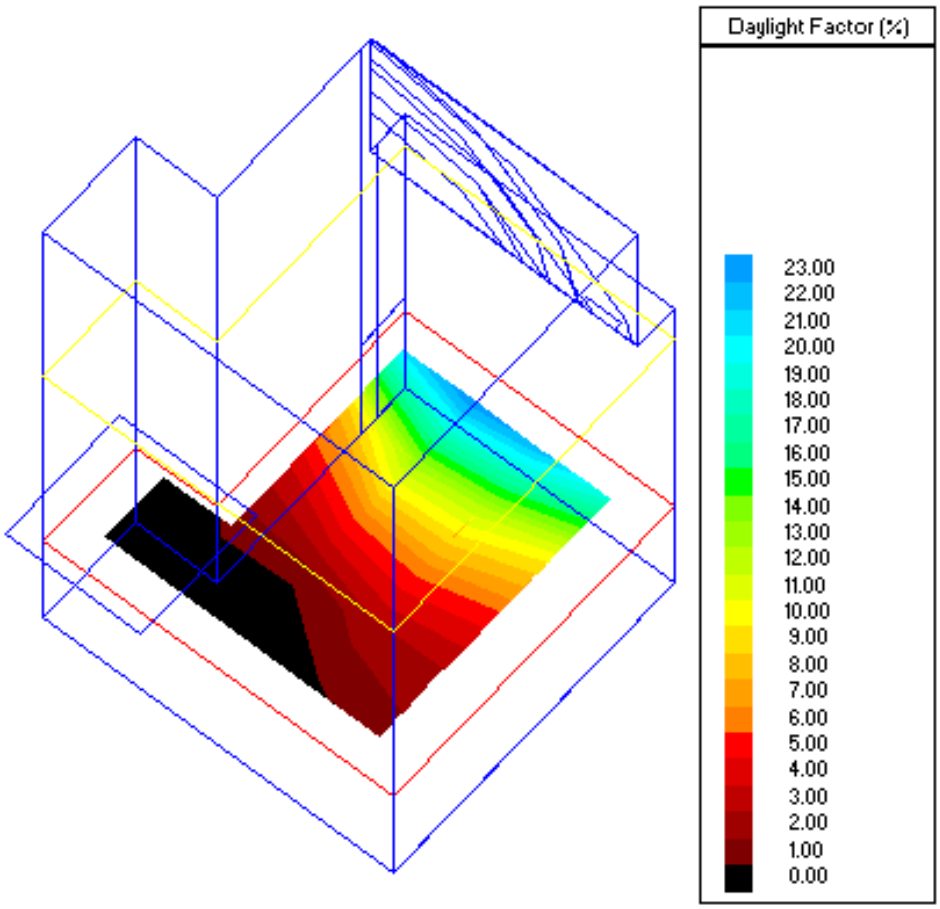
R27 Bedroom - UGF



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=27.230m² Margin=0.00 m	Daylight factor	0.2 %	7.6 %	23.1 %	0.03	0.01
	Daylight illuminance	29.84 lux	929.22 lux	2822.46 lux	0.03	0.01
	Sky view	0.00	0.91	1.00	0.00	0.00

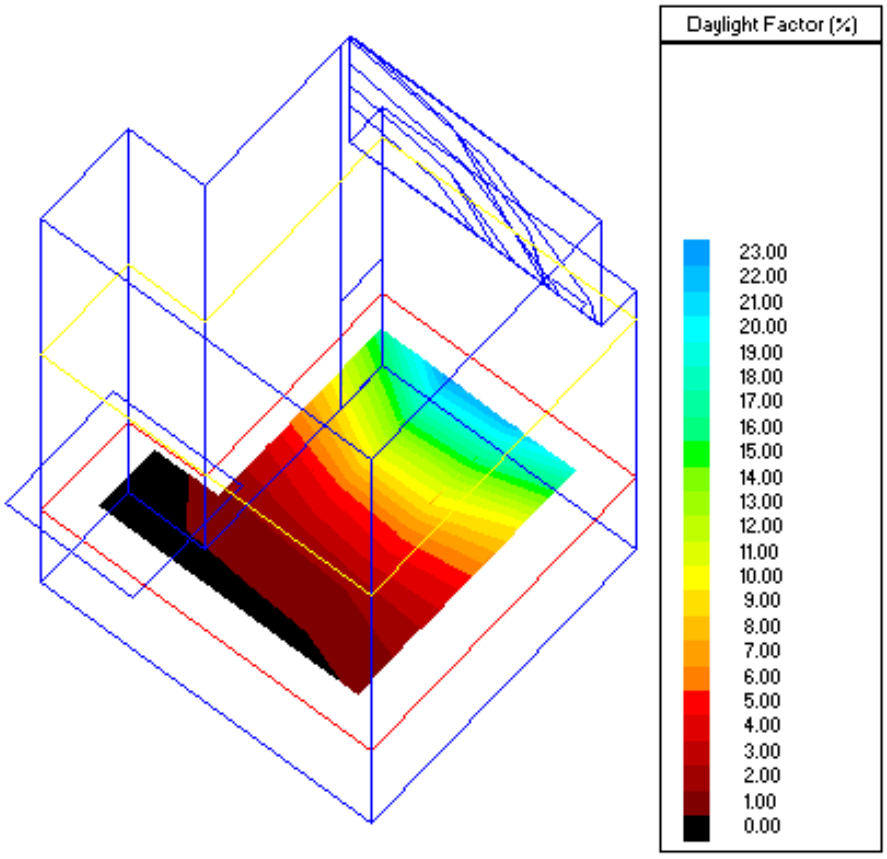
R28 Bedroom - UGF



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=15.602m² Margin=0.00 m	Daylight factor	0.0 %	7.4 %	23.8 %	0.00	0.00
	Daylight illuminance	3.32 lux	908.89 lux	2901.83 lux	0.00	0.00
	Sky view	0.00	0.91	1.00	0.00	0.00

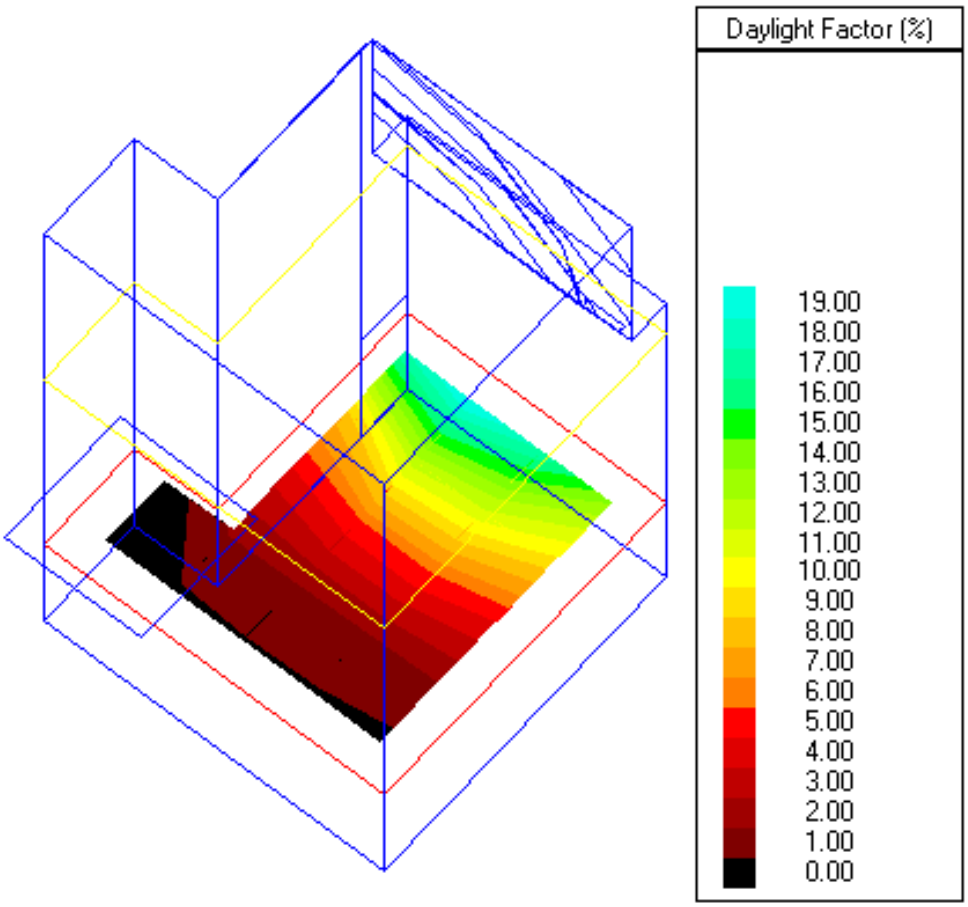
R29 Bedroom - UGF



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=32.503m² Margin=0.00 m	Daylight factor	0.3 %	7.3 %	23.2 %	0.04	0.01
	Daylight illuminance	31.50 lux	891.12 lux	2832.09 lux	0.04	0.01
	Sky view	0.00	0.82	1.00	0.00	0.00

R30 Bedroom - UGF



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=9.520m² Margin=0.00 m	Daylight factor	0.3 %	6.6 %	20.0 %	0.05	0.02
	Daylight illuminance	40.51 lux	809.89 lux	2443.04 lux	0.05	0.02
	Sky view	0.00	0.95	1.00	0.00	0.00