Daylight & Sunlight Report

26 Chetwynd Road, London, NW5 1PY

July 2022

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Executive summary

This report outlines the results of the analysis for the detailed planning application of 26 Chetwynd Road, NW5 1PY, primarily assessing the daylight and sunlight impact on the adjacent property; 28 Chetwynd Road.

The methodology set out in this report is in accordance with BRE's "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" by PJ Littlefair (2011) which is accepted as good practice by Planning Authorities.

The following assessments were carried out:

- Daylight: Vertical Sky Component (VSC)
- Sunlight: Sunlight Access, Average Probable Sunlight Hours (APSH)
- Sky View/ Daylight Distribution (DD)

The modelling part has been carried out using a dynamic modelling software: (IES-VE) version 2022. The RADIANCE lighting simulation package, developed by the Lawrence Berkeley Laboratory in California, in conjunction with IES modelling software interface has been used to perform the daylight simulations.

Daylight & Sunlight Assessment

Based on the orientation and the site layout, the adjacent property 28 Chetwynd Road, in specific the conservatory on the ground level and the first floor back room, were tested to assess the impact of the proposed extension of 26 Chetwynd Road on it, in terms of daylight and sunlight.

Results indicate that 28 Chetwynd Road will retain access to daylight and sunlight.

Date	Prepared by	Signature	Version	Comments
July 2022	Halla Huws	Halla Huws.	V1	

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Section 1 Introduction

This report assesses the impact of daylight & sunlight levels, due to the proposed extension of 26 Chetwynd Road, London, NW5 1PY.

The approach is based on the BRE's "Site Layout Planning for Daylight and Sunlight, a Guide to Good Practice" PJ Littlefair 2011, which is generally accepted as good practice by Town and Country Planning authorities.

It should be noted that although the numerical values stated in the BRE provide useful guidance to designers, consultants and planning officials, these are purely advisory and may vary depending on context.

Site Location

The proposal consists of a back extension to the ground level of 26 Chetwynd Road (Figure 1).

Based on the orientation and sun cast analysis (Figure2), the neighboring property, 28 Chetwynd required testing, in particular, the ground floor conservatory and the first floor south east room, to investigate the impact in terms of daylight and sunlight. Non habitable rooms were not included in the calculations.

Figure 1: Site Location

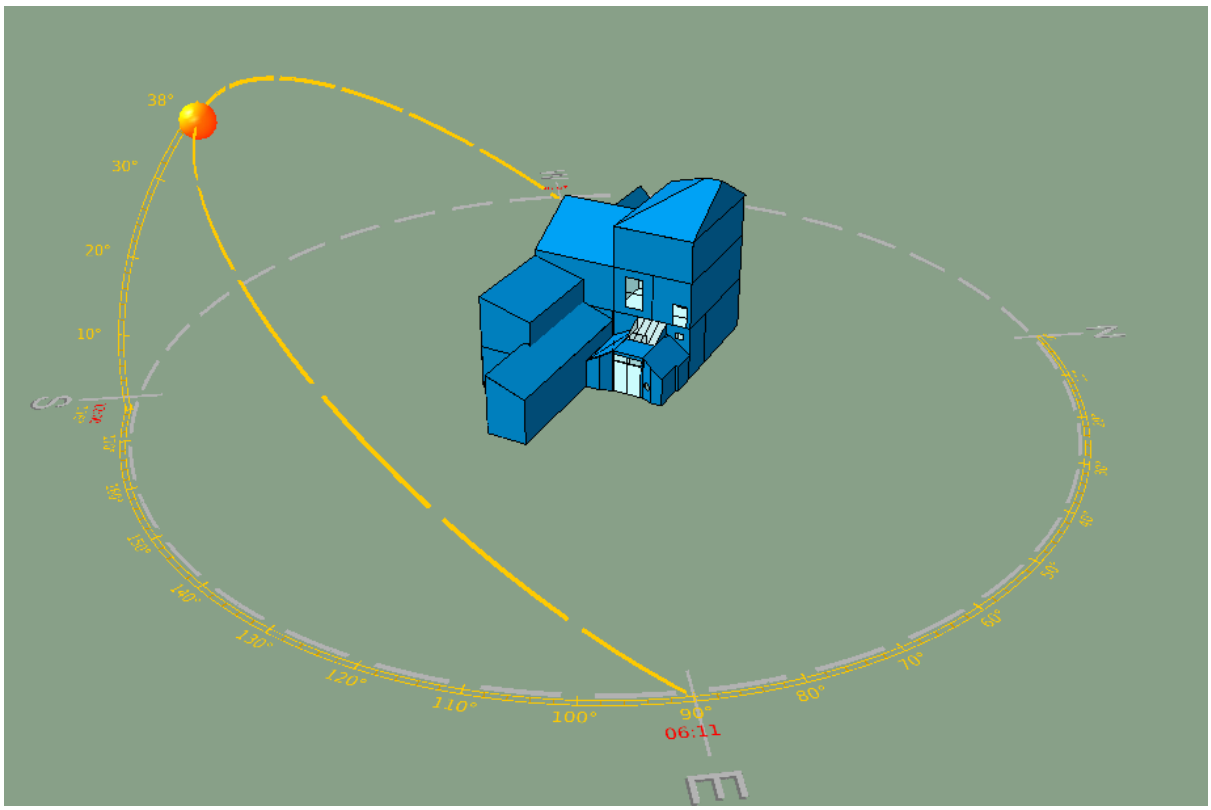


Figure 2 IES Model Showing Orientation

Documents Considered

Table 1: List of Drawings

Description	Drawing Reference
28 Chetwynd	02 existing elevation 04 existing plan
26 Chetwynd Existing plans, sections and elevations	CHETWYND ROAD_ existing drawings
26 Chetwynd Proposed plans, sections and elevations	CHETWYND ROAD_ proposed drawings

Calculation Data

Weather file: London

Software: IES-VE 2022

Sky Model: CIE Standard Overcast Sky

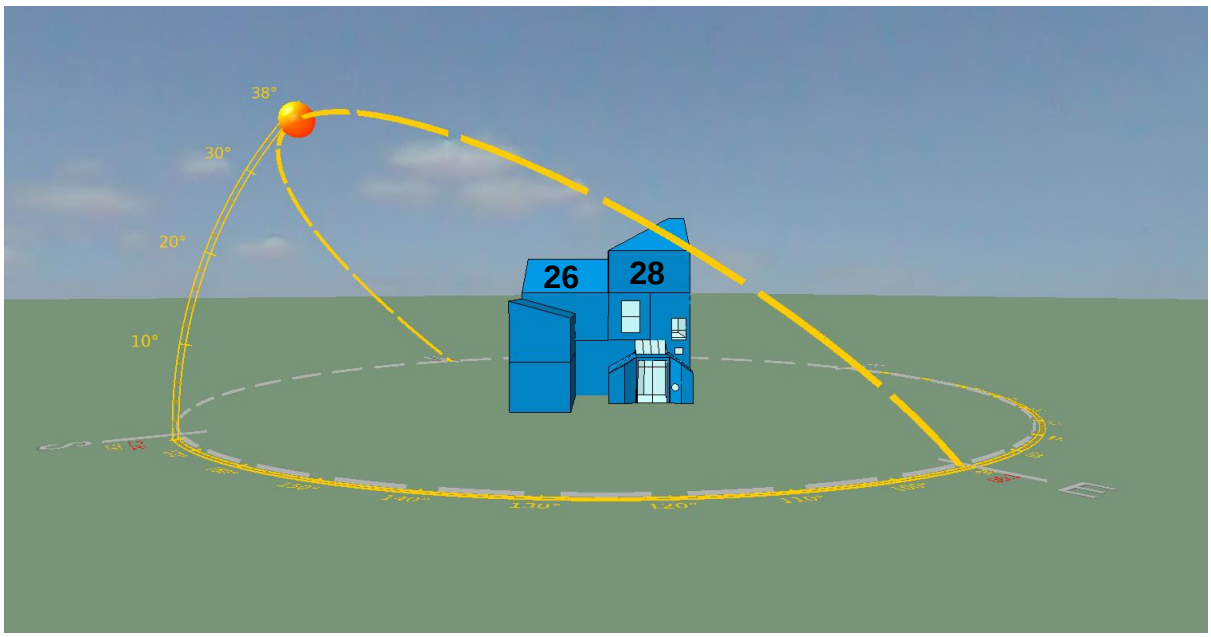


Figure 3: IES Model as existing scenario

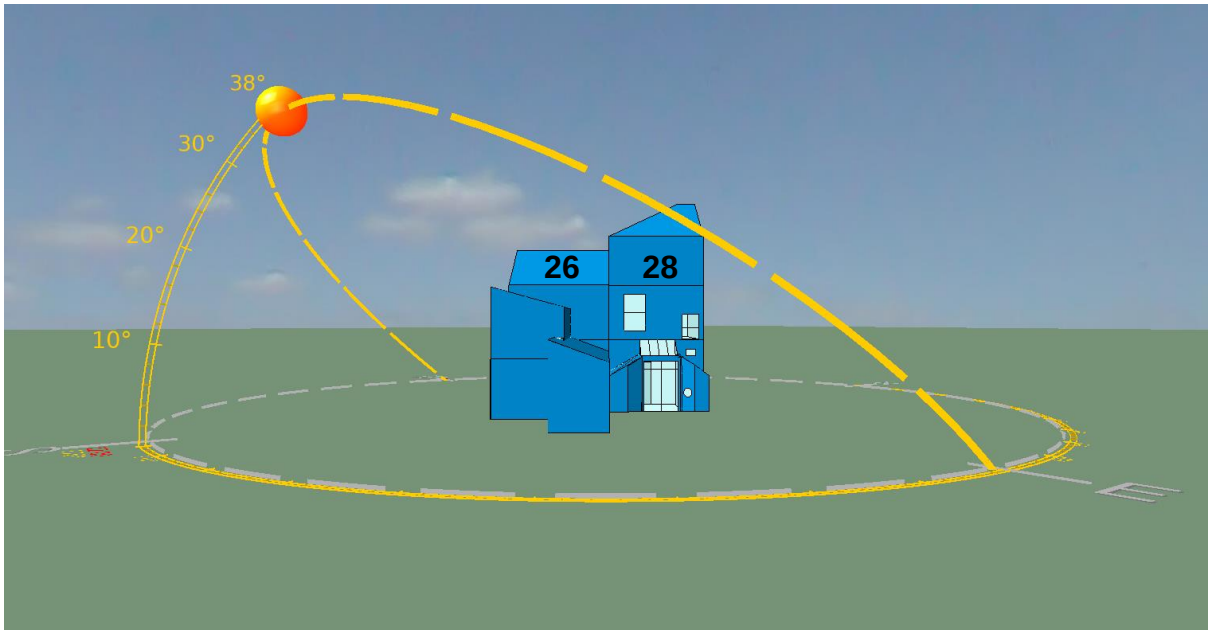


Figure 4: IES model proposed scenario

Methodology

The following methodology was used to carry out the daylight, sunlight and overshadowing assessments. The methodology is based on the guidelines set out in the BRE "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" (2011).

Vertical Sky Component

The BRE document definition of the (VSC) is: Ratio of the part of illuminance, at a point on a given vertical plane that is received directly from a CIE standard overcast sky, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the 'given vertical plane' is the outside of a window wall. The VSC does not include reflected light, either from the ground or from other buildings.

The VSC is usually expressed as a percentage and the maximum value for a completely unobstructed window is slightly less than 40%. The recommendations set down in the BRE report,' Site layout for daylight and sunlight, a guide to good practice', would indicate, for residential properties, that a VSC value of greater than 27% is acceptable.

The BRE guide explains that diffuse daylight may be adversely affected if, after a development, the VSC is both less than 27% and less than 0.8 times its former value. If a room has two or more windows of equal size, the mean of their VSCs may be taken.

It should be noted that the Guide itself, within the introduction, states that the advice given was not mandatory and the Guide should not be seen as an instrument of planning policy, its aim being to help rather constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly.

Table 2: Magnitude of change for Vertical Sky Component (VSC) Results

VSC Values	Ratio of Impact	Magnitude of change
VSC ≥27%	≥0.8	Negligible
VSC ≥ 27%	< 0.8	Negligible
VSC < 27%	> 0.8	Negligible
VSC < 27%	0.7 – 0.8	Low
VSC < 27%	0.6 – 0.7	Medium
VSC < 27%	< 0.6	High

Average Daylight Factor

Average Daylight Factor Interior daylighting levels in rooms can be determined using Average Daylight Factor calculations. The Average Daylight Factor is the average illuminance on the working place in a room, divided by the illuminance on an unobstructed horizontal surface outdoors, and is usually expressed as a percentage. This is not a requirement for the impact analysis, nevertheless results are shown in Appendix 1.

Sky View (No Sky Line)

The No sky line is the outline on the working plane of the area from which no sky can be seen. This is to determine the light distribution in a room. The IES-ve calculation method is to define the sky view factor, which is the factor from the surface to the sky, this is the ratio of the diffuse sky radiation received by the surface to that which would be received by the same surface if it were completely exposed to the sky (The theory assumes that the diffuse sky radiation is isotropic).

A significant loss is when the area of a working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value.

Annual probable sunlight hours (APSH)

APSH is the total number of hours in the year that the sun is expected to shine on the center of each window, allowing for average levels of cloudiness for the location in question. This test is usually used to test façade within 90 degrees of due south.

The BRE Handbook notes that: "…*a south facing window will, in general, receive most sunlight, while a north facing one will receive it only on a handful of occasions. East and west facing windows will receive sunlight only at certain times of day*".

The BRE Handbook suggests that: "*all main living rooms of dwellings… should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun*".

If a room has multiple windows on the same wall or on adjacent walls, the highest value of APSH should be taken. If a room has two windows on opposite walls, the APSH due to each can be added together.

The BRE guide explains that sunlight availability may be adversely affected if the center of the window:

- Receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between 21st of September and 21st March and;
- Receives less than 0.8 times its former sunlight hours during either period and;
- Has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours

Table 3: Magnitude of change for APSH Results

APSH Values	Ratio of Impact	Absolute reduction in APSH	Magnitude of change
APSH ≥25%	> 0.8	≤ 4%	Negligible
APSH ≥25%	> 0.8	> 4%	Negligible
APSH ≥25%	< 0.8	> 4%	Negligible
APSH <25%	> 0.8	≤ 4%	Negligible
APSH <25%	> 0.7	> 4%	Low
APSH <25%	0.6-0.7	> 4%	Medium
APSH <25%	< 0.6	> 4%	High

Section 2 Daylight and Sunlight Assessments

A daylight assessment was carried out for the conservatory to the back of the ground floor of 28 Chetwynd Road and the first floor room as shown in Fig 5 below, this is due to proximity, the orientation and the shading analysis carried out. The analysis does not include non-habitable rooms, therefore the WC and circulation areas have been excluded.

Sky view levels occurred no change and maintained 100% sky view, as shown in Table 4.

The Vertical Sky Levels (VSL) were tested. The results in Table 5 indicate that the reduction due to the proposal is negligible.

The Average Probable Sunlight Hours (APSH) is used to test façade within 90 degrees of due south. The analysis indicated that both rooms would not be affected and there is no reduction as shown in Table 6.

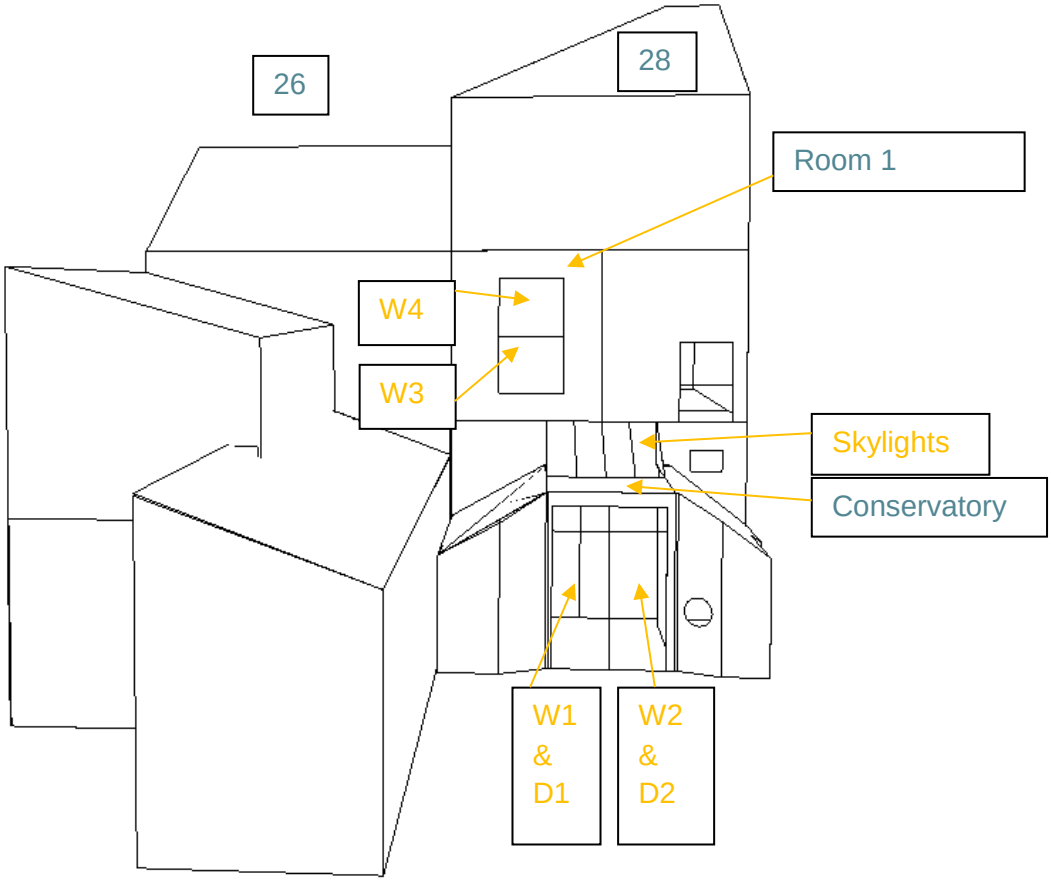


Figure 5 Tested rooms and windows

Table 4: Sky View results

Building	Zone	Existing Sky view	Proposed Sky view	Reduction	Impact
28 Chetwynd	Conservatory	1	1	0	None
	Room 1	1	1	0	None

Table 5: Vertical Sky Component results

Building	Zone	Window	Existing VSC (%)	Proposed VSC (%)	Reduction	Impact
28 Chetwynd	Conservatory	W1	37.19	36.74	1%	Negligible
		W2	37.90	37.53	1%	Negligible
		D1	38.15	33.53	12%	Negligible
		D2	38.68	35.26	9%	Negligible
	Room1	W3	38.41	38.40	0%	Negligible
		W4	39.34	39.32	0%	Negligible

Table 6: Average Probable Sunlight Hours

Building	Zone/ Opening	Scenario	Total Average (%)	Winter Average (%)	Summer Average (%)	Impact
28 Chetwynd	Conservatory	Existing	58.60	21.86	36.73	None
		Proposed	58.60	21.86	36.73	
	Skylights	Existing	62.95	23.56	39.39	None
		Proposed	62.95	23.56	39.39	
	Room 1	Existing	65.28	28.47	36.81	None
		Proposed	65.28	28.47	36.81	

Section 3: Shading analysis

A shading analysis has been carried out to study the proposed extension impact in terms of shading. The tables below are showing the shading on 21st of Dec, 21st of March and 21st of June. The additional shading of the proposed extension will have on the neighboring properties is mainly occurring midday in December, taking into account the trees and fence between the two properties, this additional small amount will not be noticeable. In terms of BRE recommendations it is negligible as shown in the numerical analysis.

Table 7: Shading 21st of December

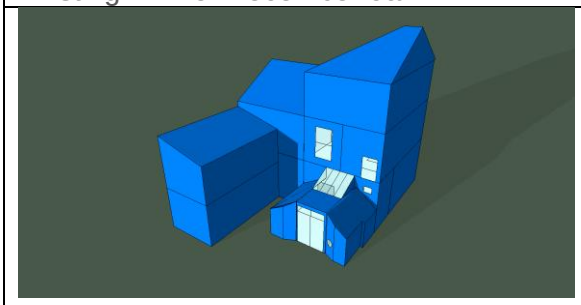
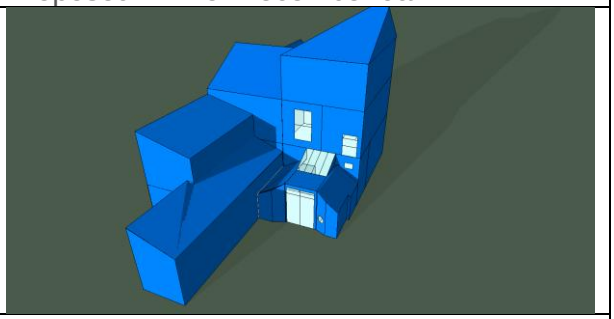
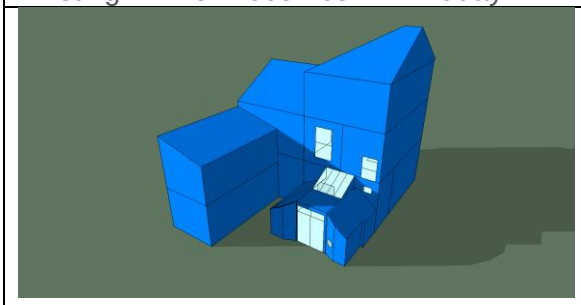
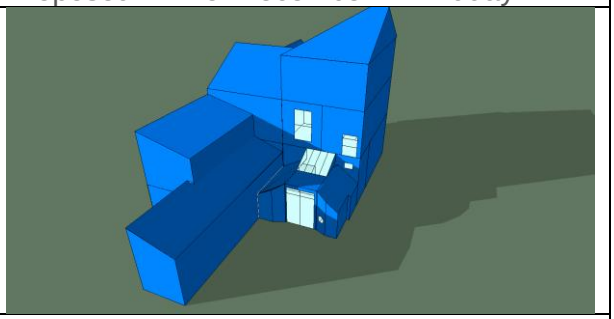
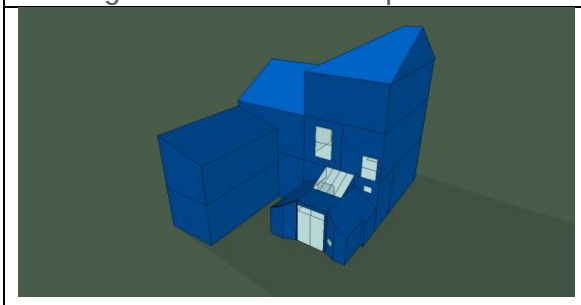
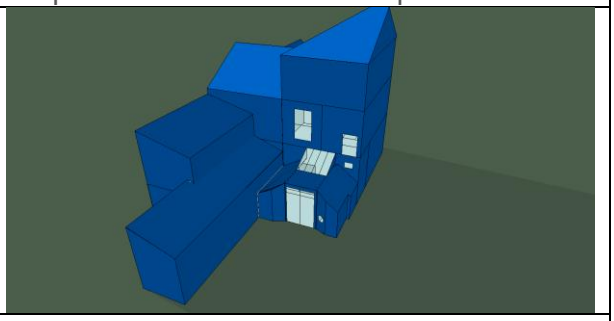
Existing: 21st of December 9am	Proposed: 21st of December 9am
	
Existing: 21st of December 12 Midday	Proposed: 21st of December 12 Midday
	
Existing: 21st of December 3pm	Proposed: 21st of December 3pm
	

Table 8: Shading 21st of March

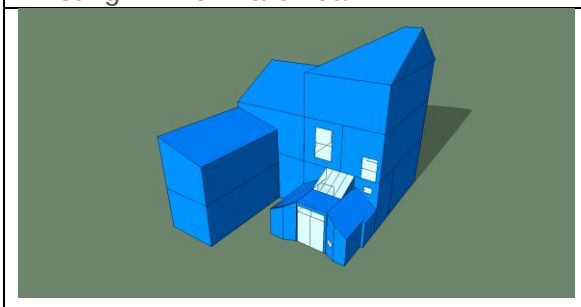
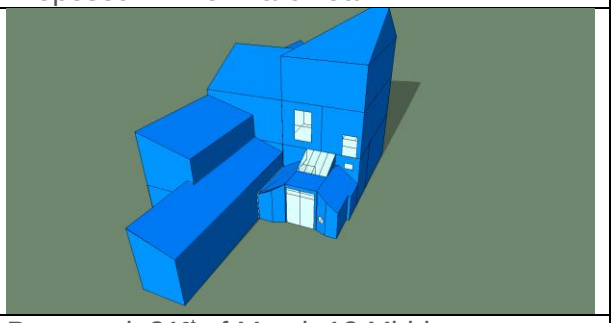
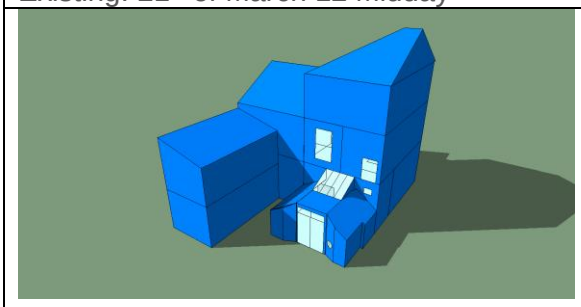
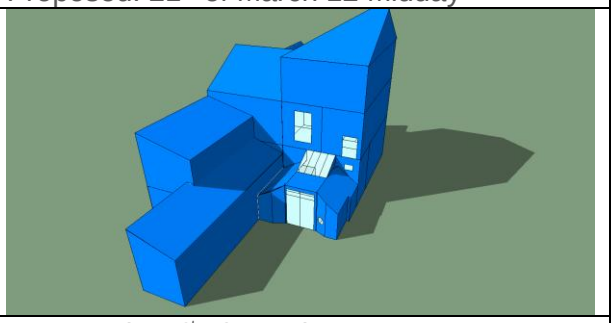
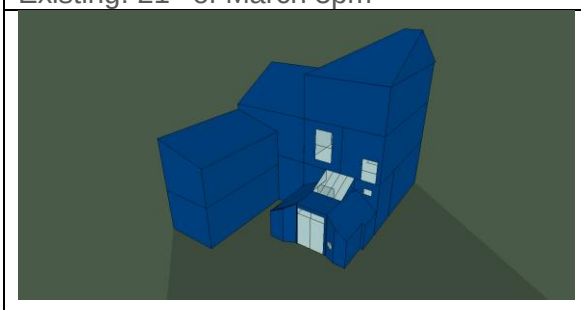
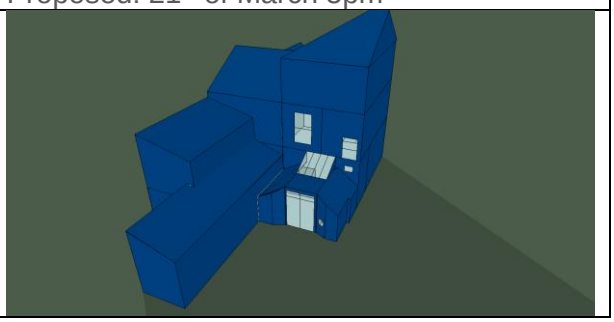
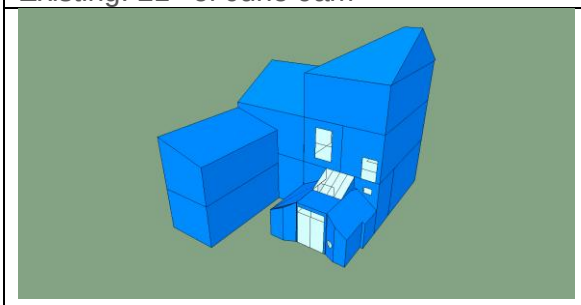
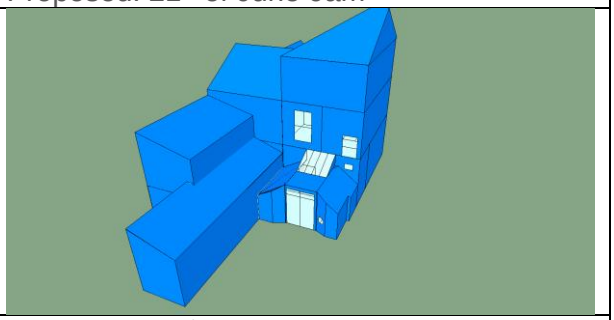
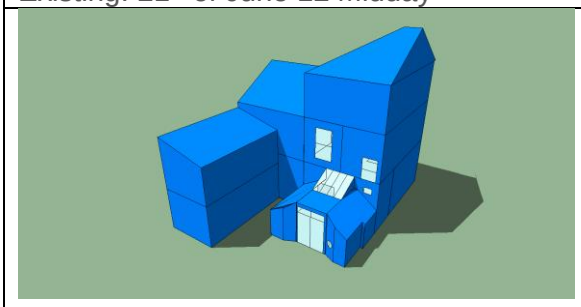
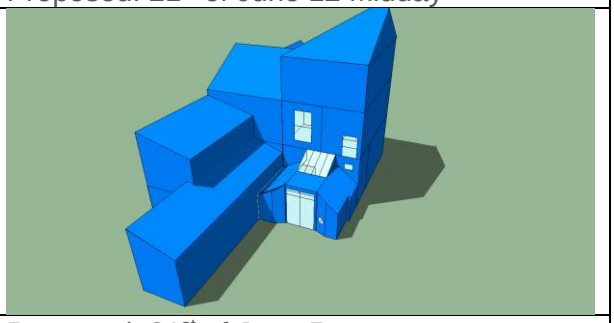
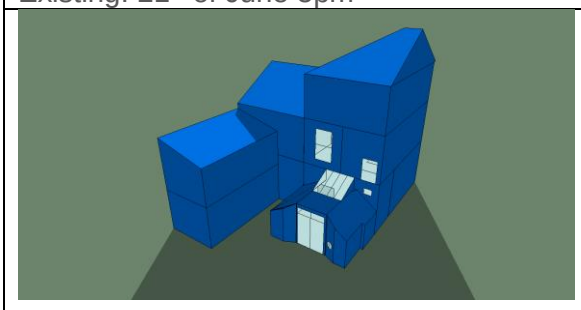
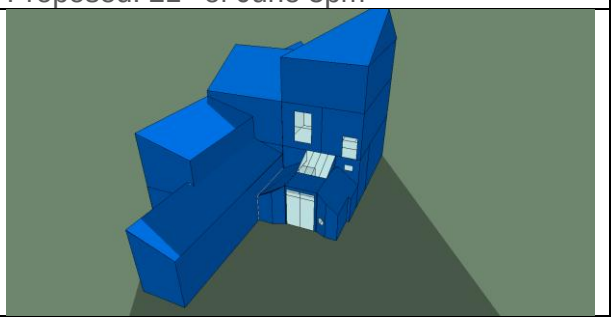
Existing: 21st of March 9am	Proposed: 21st of March 9am
	
Existing: 21st of March 12 Midday	Proposed: 21st of March 12 Midday
	
Existing: 21st of March 5pm	Proposed: 21st of March 5pm
	

Table 9: Shading 21st of June

Existing: 21st of June 9am	Proposed: 21st of June 9am
	
Existing: 21st of June 12 Midday	Proposed: 21st of June 12 Midday
	
Existing: 21st of June 5pm	Proposed: 21st of June 5pm
	

Conclusion

A daylight assessment was carried out for all windows and the room that might be at risk of losing sunlight or daylight due to the proposed extension of 26 Chetwynd Road.

The daylight and sunlight analysis was carried out for both the existing and proposed scenarios to investigate the impact of the proposed on the neighboring property, 28 Chetwynd Road, mainly the conservatory on the Ground floor, and the first floor back room.

Results of the Vertical Sky Component, Sky View and the APSH all show that the impact is negligible. Indicating that all rooms at 28 Chetwynd Road will retain access to daylight and sunlight.

APPENDIX A: MODEL OUTPUTS

Room CN000000 (Conservatory- Existing)

Analysis calculation for room -

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=4.767m² Margin=0.50 m	Daylight factor	2.1 %	8.8 %	18.4 %	0.24	0.11
	Daylight illuminance	253.91 lux	1077.76 lux	2242.15 lux	0.24	0.11
	Sky view	1.00	1.00	1.00	1.00	1.00

Room FR000000 (Room 1 - Existing)

Analysis calculation for room -

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=3.254m² Margin=0.50 m	Daylight factor	0.9 %	4.4 %	14.2 %	0.20	0.06
	Daylight illuminance	110.48 lux	543.11 lux	1736.98 lux	0.20	0.06
	Sky view	1.00	1.00	1.00	1.00	1.00

Room CN000000 (Conservatory- Proposed)

Analysis calculation for room -

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=4.767m² Margin=0.50 m	Daylight factor	2.1 %	8.7 %	17.6 %	0.24	0.12
	Daylight illuminance	251.67 lux	1059.76 lux	2154.90 lux	0.24	0.12
	Sky view	1.00	1.00	1.00	1.00	1.00

Room FR000000 (Room 1 -Proposed)

Analysis calculation for room -

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=3.254m² Margin=0.50 m	Daylight factor	0.9 %	4.4 %	14.2 %	0.20	0.06
	Daylight illuminance	110.13 lux	542.32 lux	1736.07 lux	0.20	0.06
	Sky view	1.00	1.00	1.00	1.00	1.00

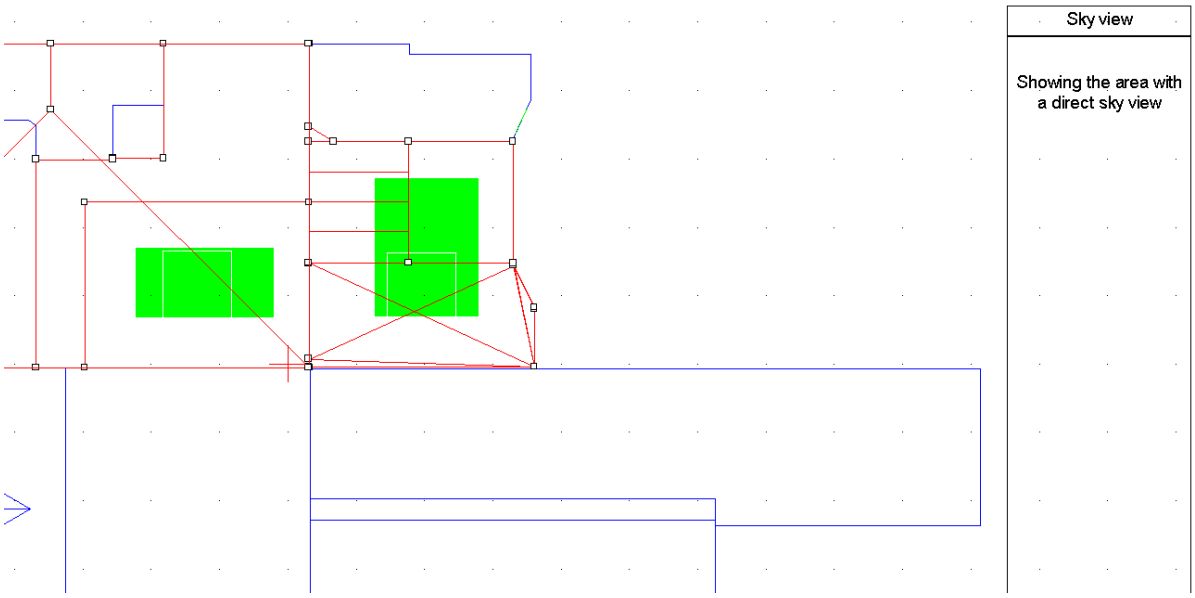


Figure 6 Sky View LGF Living Proposed Scenario

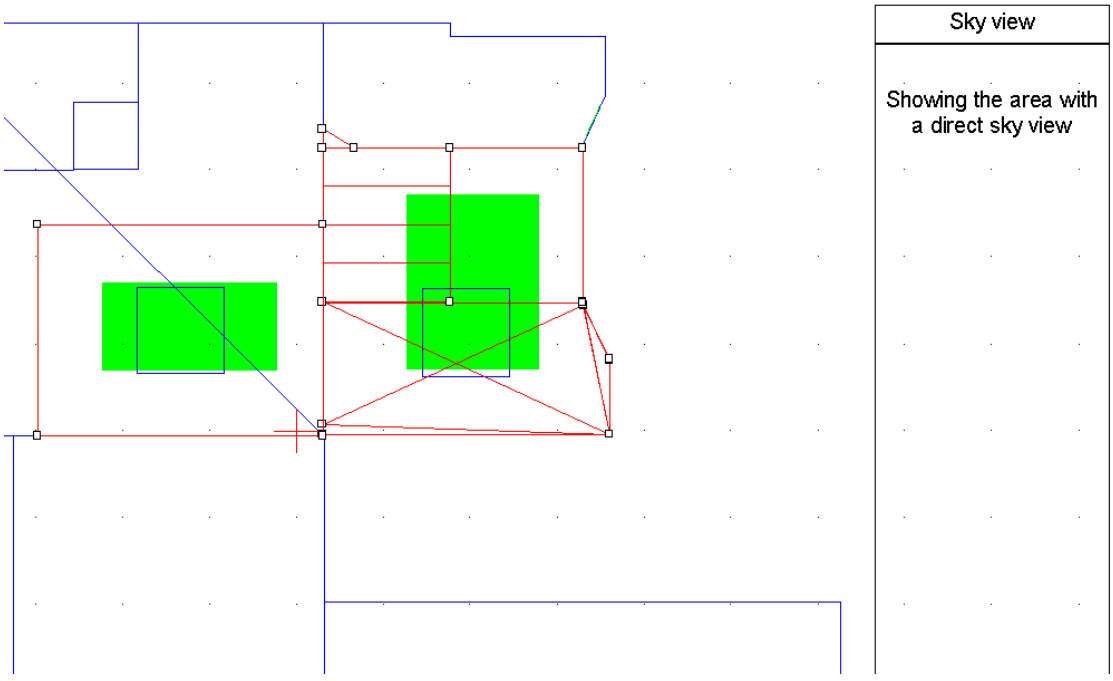


Figure 7 Sky View LGF Living Existing Scenario