

9 Wood Street, Greenock, PA1 7ST

Daylighting Study

May 2021

Table of Contents

1.	EXECUTIVE SUMMARY.....	3
2.	INTRODUCTION.....	4
3.	INFORMATION SOURCES.....	5
4.	METHODOLOGY AND SIMULATION STRATEGY.....	7
4.1	Daylight Assessment.....	7
4.2	Daylight to Windows.....	7
5.	MODEL INPUTS.....	9
5.1	Site Model Images.....	9
6.	VERTICAL SKY COMPONENT (VSC) RESULTS.....	10
6.1	Neighbouring Property – 11 Wood Street.....	10
7.	CONCLUSIONS.....	11

Figures

Figure 1:	Location Plan.....	6
Figure 2:	Google Maps Site Photo (highlighting South facade).....	6
Figure 3:	Vertical Sky Component.....	8
Figure 4:	shows model image of existing site including neighbouring property.....	9
Figure 5:	shows model image of proposed site including neighbouring property.....	9
Figure 6:	Compliant VSC windows on South façade of 11 Wood Street.....	10

Tables

Table 1.	Drawing Information.....	5
Table 2.	Compliant VSC Results.....	10

1. EXECUTIVE SUMMARY

LightSIM was commissioned by Mr Gordon Cunningham to assess daylight levels to the existing residential property at 11 Wood Street, Greenock with the introduction of the proposed extension to 9 Wood Street in Greenock.

The study was based on numerical tests set out in the Building Research Establishment (BRE) guide 'Site Layout Planning for Daylight and Sunlight: a guide to good practice' by P J Littlefair 2011.

The report details the numerical results for the Vertical Sky Component test.

The results confirm that all 4No. windows tested at 11 Wood Street pass the BRE Vertical Sky Component test.

In summary, the proposed development will have a low impact on the daylight received by lower level windows on the South façade of 11 Wood Street.

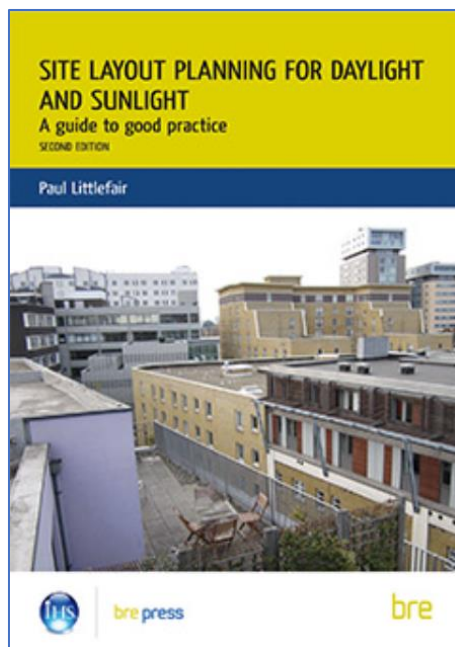
2. INTRODUCTION

LightSIM was commissioned by Mr Gordon Cunningham to assess daylight levels to the existing residential property at 11 Wood Street in Greenock with the introduction of the proposed extension to Mr Cunningham's property at 9 Wood Street in Greenock.

A 3D model was created for both the proposed development site and the existing site.

The Assessment has been carried out in accordance with criteria set out in the following documents.

- BRE Site Layout – Planning for Daylight and Sunlight (2nd Edition)



- Inverclyde Local Development Plan - Planning Application Advice Note No. 4 - HOUSE EXTENSIONS

3. INFORMATION SOURCES

Using AutoCAD drawings and a SketchUP model, a 3-dimensional model was created for the proposed development and adjacent residential property.

Allison Architects provided the following information for this assessment.

Table 1. Drawing Information

Drawing Number	Drawing Name	Format
-	Wood Street03	SketchUP Model
00-001	Location Plan	PDF
00-002	Existing and Proposed Block Plans	PDF
01-001	Ground Floor Plan (as Existing)	PDF
01-002	First floor and Roof Plans (As Existing)	PDF
01-003	Elevations (As Existing)	PDF
01-004	Sections (As Existing)	PDF
02-001	Ground Floor Plan (as Proposed)	PDF
02-002	First Floor Plan (as Proposed)	PDF
02-003	Roof Plan (As Proposed)	PDF
02-004	West Elevation (As Proposed)	PDF
02-005	South Elevations (As Proposed)	PDF
02-006	North Elevations (As Proposed)	PDF
02-007	East Elevations (As Proposed)	PDF



Figure 1: Location Plan



Figure 2: Google Maps Site Photo (highlighting South facade)

4. METHODOLOGY AND SIMULATION STRATEGY

4.1 Daylight Assessment

This study is based on the vertical sky component test set out in the Building Research Establishment (BRE) guide 'Site Layout Planning for Daylight and Sunlight: a guide to good practice' by P J Littlefair 2011.

The standards set out in the BRE guide are intended to be used flexibly.

The following statement is quoted directly from the BRE guide:

"The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and the guide 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, since natural lighting is only one of many factors in site layout design."

4.2 Daylight to Windows

Diffuse daylight is the light received from the sun which has been diffused through the sky. Even on a cloudy day, when the sun is not visible, a room will continue to be lit with light from the sky. This is diffuse daylight.

Diffuse daylight calculations should be undertaken to all rooms where daylight is required, including living rooms, kitchens and bedrooms. Usually, if a kitchen is less than 13m², it is considered to be a non-habitable room and the daylight tests need not be applied. The BRE guide states that windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed.

The BRE guide contains the following tests for new developments:

Vertical Sky Component

The Vertical Sky Component (VSC) is the ratio of daylight falling on a vertical surface to the daylight available under an unobstructed sky.

Diffuse daylight may be affected if after a development the Vertical Sky Component is both less than 27% and less than 0.8 times its former value.

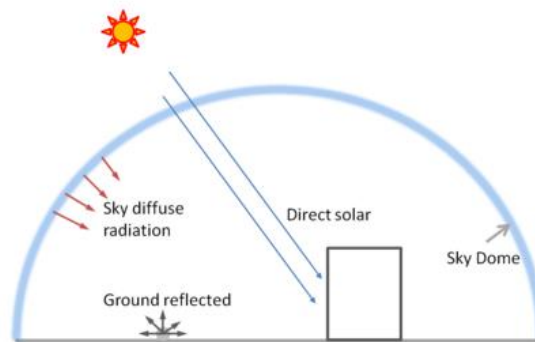


Figure 3: Vertical Sky Component

Average Daylight Factor

The Average Daylight Factor (ADF) test takes account of the interior dimensions and surface reflectance within the room being tested as well as the amount of sky visible from the window. For this reason, it is considered a more detailed and representative measure of the adequacy of light. The minimum ADF values recommended in BS8206 Part 2 are: 2% for family kitchens (and rooms containing kitchens); 1.5% for living rooms; and 1% for bedrooms. This is a test used in assessing new developments, although, in certain circumstances, it may be used as a supplementary test in the assessment of daylighting in existing buildings, particularly where more than one window serves a room.

The Average Daylight Factor test was not required for this analysis as the Vertical Sky Component criteria was achieved.

5. MODEL INPUTS

Calculations were completed using the MBS Software for Sketchup and the Integrated Environmental Solutions (IES) Virtual Environment (VE) software suite.

Both the MBS and IES VE software takes the following parameters into account:

- Position of your building and site
- Time of day and date
- Sky conditions
- Material properties
- Shading surfaces
- Adjacent buildings

5.1 Site Model Images

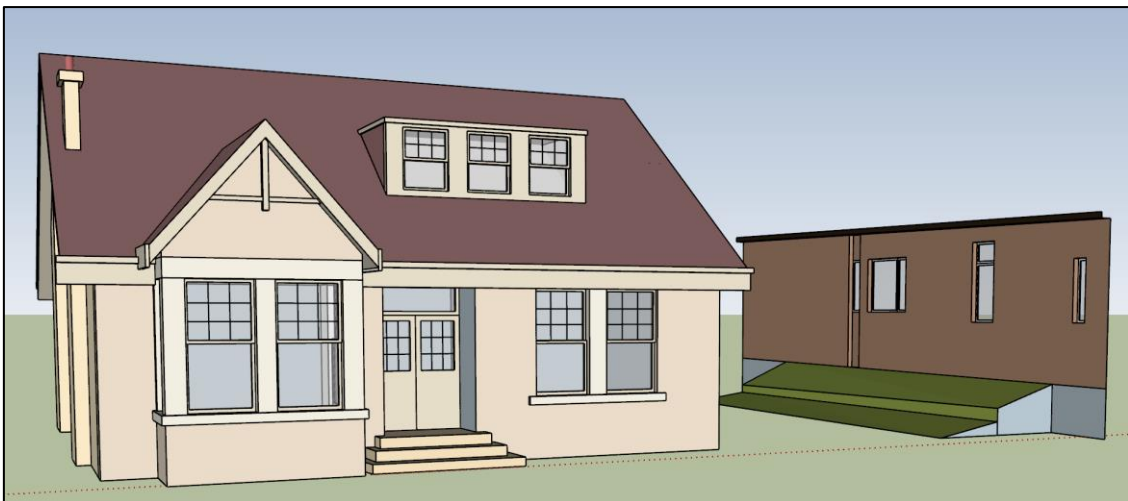


Figure 4: shows model image of existing site including neighbouring property

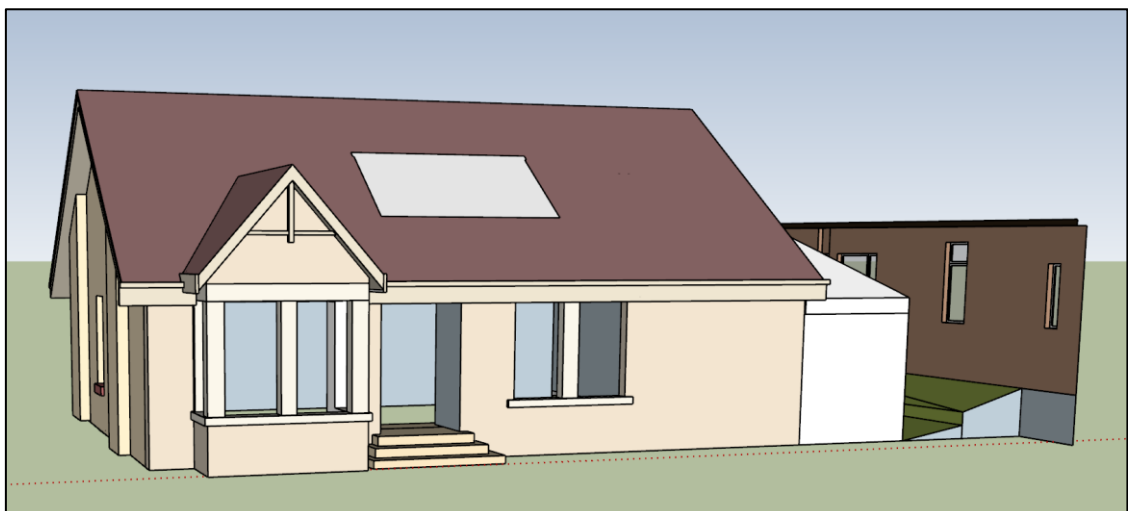


Figure 5: shows model image of proposed site including neighbouring property

6. VERTICAL SKY COMPONENT (VSC) RESULTS

The recommendations defined in the BRE Guidance, “Site layout planning for daylight and sunlight, a guide to good practice” indicate, for residential properties, that a Vertical Sky Component value of greater than 27% is acceptable, or if less then cannot be less than 0.8 times the existing VSC value.

Four windows have been assessed to show Vertical Sky Component (VSC) results on the South façade of 11 Wood Street, adjacent to the proposed development site at 9 Wood Street, Greenock. These windows have been labelled and shown below in Figure 6.

Figure 2 shows a number of large trees between the 2 properties on Wood Street, these trees have not been included in this analysis. It is expected that these trees would have an impact on the existing VSC levels, likely making them lower than currently reported. This in turn would increase the ratio between proposed and existing results.

6.1 Neighbouring Property – 11 Wood Street

	Windows highlighted in GREEN meet criteria
	Windows highlighted in RED are below criteria

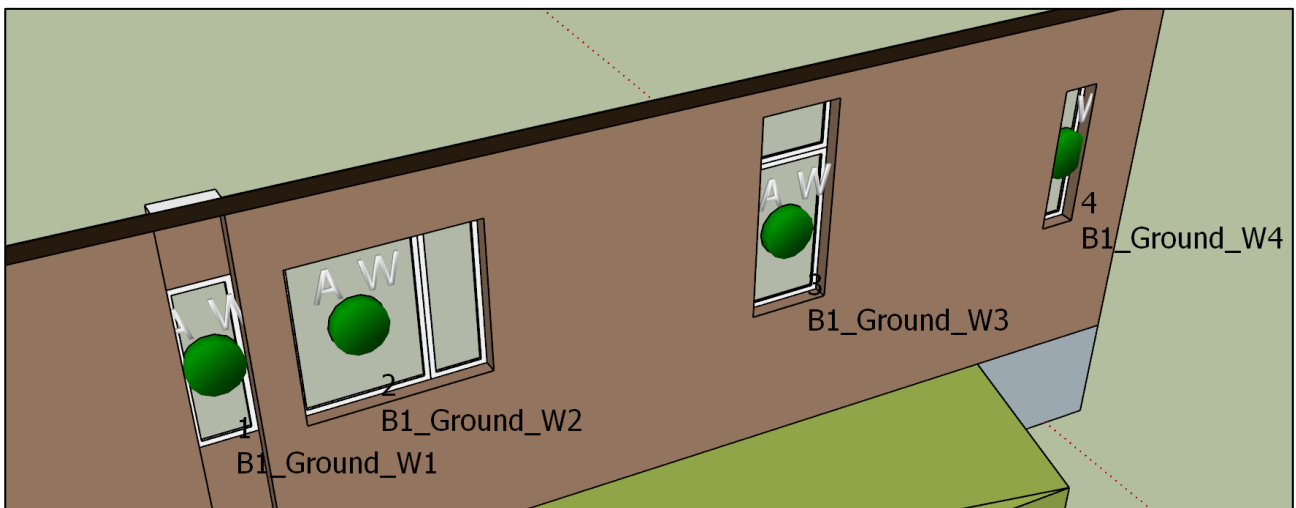


Figure 6: Compliant VSC windows on South façade of 11 Wood Street

Table 2. Compliant VSC Results

Building Name	Floor Level	Window Name	Window Number	VSC Existing	VSC Proposed	Proposed/ Existing Ratio	Meets BRE Criteria
B1	Ground	W1	1	27.13	21.71	0.8	YES
B1	Ground	W2	2	31.18	25.64	0.82	YES
B1	Ground	W3	3	30.42	26.66	0.88	YES
B1	Ground	W4	4	25.41	25.01	0.98	YES

7. CONCLUSIONS

The purpose of this report was to assess the daylight by way of Vertical Sky Components on low level windows on the south façade of existing residential property at 11 Wood Street, Greenock with the introduction of the proposed extension to the residential property at 9 Wood Street, Greenock.

We can confirm that all 4No. windows assessed achieve the criteria set out in the BRE Guide as the Vertical Sky Component (VSC) for all windows achieves the required 80% or above ratio.

We can confirm that the development meets the required criteria for a new development in accordance with the BRE Guidance 'Site Layout Planning for Daylight and Sunlight: a guide to good practice' by P J Littlefair 2011.