ROBERT
BOURKE
ARCHITECTS

Planning Department,
South Dublin County Council
County Hall Tallaght,
Dublin 24,
D24 A3XC

8th July 2022

Dear Sir / Madam

Re: Request for Additional Information - 157 Oldcourt Road, Firhouse, Dublin 24

Decision Order Number: 0463
Register Reference: SD22B/0061

Please find enclosed the additional information in connection with the above planning application.

In relation to Item 1, a detailed daylight analysis report for bedroom 1 has been carried out. This report demonstrates that currently the daylight levels are less than adequate, and that the proposed work will improve the penetration of daylight into the room, more than doubling the average daylight factor. We trust that this report is sufficient to mitigate your concerns and you will accept that the design proposal has therefore not been amended.

In relation to Item 3, due to the poor soakage rate found during the percolation test, a soakway was found not to be suitable. For this reason an attenuation system has been proposed instead.

We look forward to receiving your response.

Yours faithfully

Robert Bourke

Robert Bourke MRIAI

ENCLOSED DOCUMENTS:

Daylight Analysis Report
Drainage Design Report

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Natural Daylight Analysis

Bedroom 1

157 Oldcourt Road, Dublin 24

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Abstract

As part of the planning application for 157 Oldcourt Road (SD22B/0061), a concern was raised by South Dublin County Council in regard to the impact the extension would have on the daylight to bedroom 1. This report shows that currently the daylight levels in the room are less than adequate and that the proposed works would vastly improve the daylight to bedroom 1, more than doubling the average daylight factor.

Introduction

This document is a study into the current natural light levels in bedroom 1 of 157 Oldcourt Road, Dublin 24, and how the proposed rear extension to the house would impact the natural light levels. Daylight to all other rooms is ignored.

Glossary of Terms

Daylight Factor - The daylight factor is defined as the ratio of horizontal indoor to outdoor illumination by daylight under continuously overcast sky conditions, expressed as a percentage.

Lux - The lux is the SI derived unit of illuminance, measuring luminous flux per unit area. It is equal to one lumen per square metre.

Method

1. The building was modelled in software called "Integrated Environmental Solutions – Virtual Environment" (IESVE). A daylight simulation was carried out using the FlucsDL application within IESVE. The model was then altered to include the proposed extension and skylight, then the daylight simulation was rerun.
2. A daylight meter was used to measure current daylight levels in the bedroom. Daylight levels were also measured on the stairs as this location has a north facing skylight and therefore can be used as an indicator as to the possible light levels from a north facing skylight in bedroom 1.

As this report is only concerned with bedroom 1, all other windows and doors are omitted as they have no bearing on the results.

Details

Building is located at 53.270206, -6.342360.

All dimensions taken from site visit and proposed drawings.

New skylight measures 1.2m x 1.2m.

Calculations are on a working plane of 0.85m.

Calculation method is point by point plus radiosity.

The sky is set as CIE overcast sky, as recommended by CIBSE.

Reflectances of interior surfaces:

Ceilings 70%

Walls 50%

Floor 20%

Existing Building

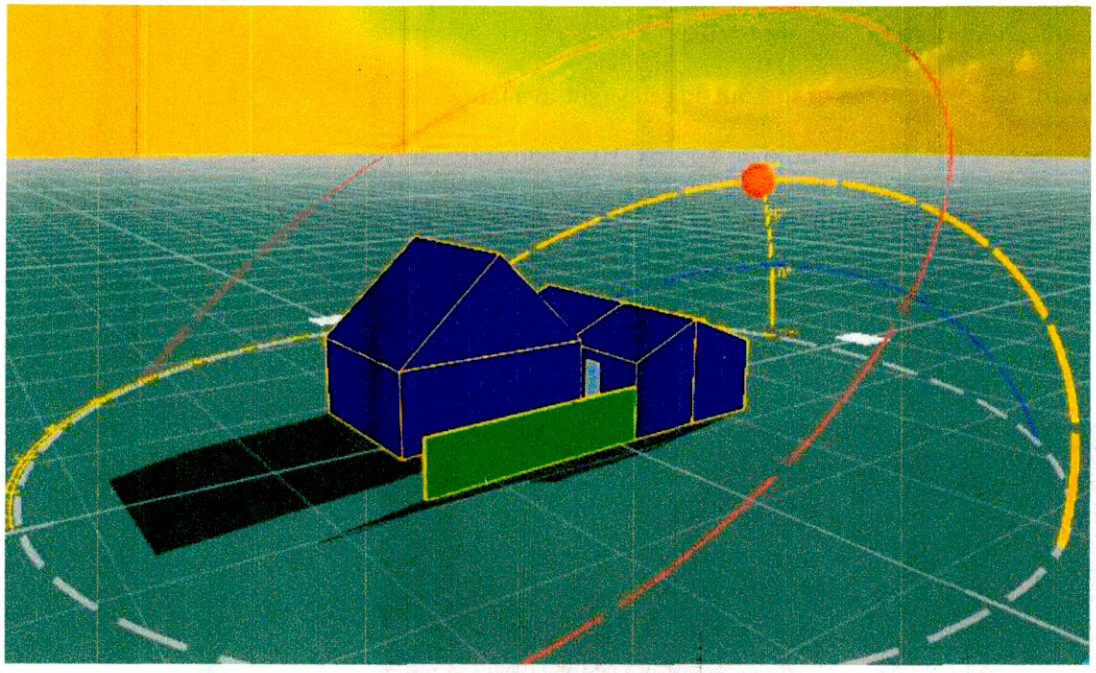

Figure 1: Existing Building

Figure 1: Existing Building shows the house as it is. There is no skylight in bedroom 1. The solar arcs show December 21st in blue, March 21st in yellow and June 21st in red. The green wall is the existing party wall between the rear garden and the neighbour's property.

Proposed Building

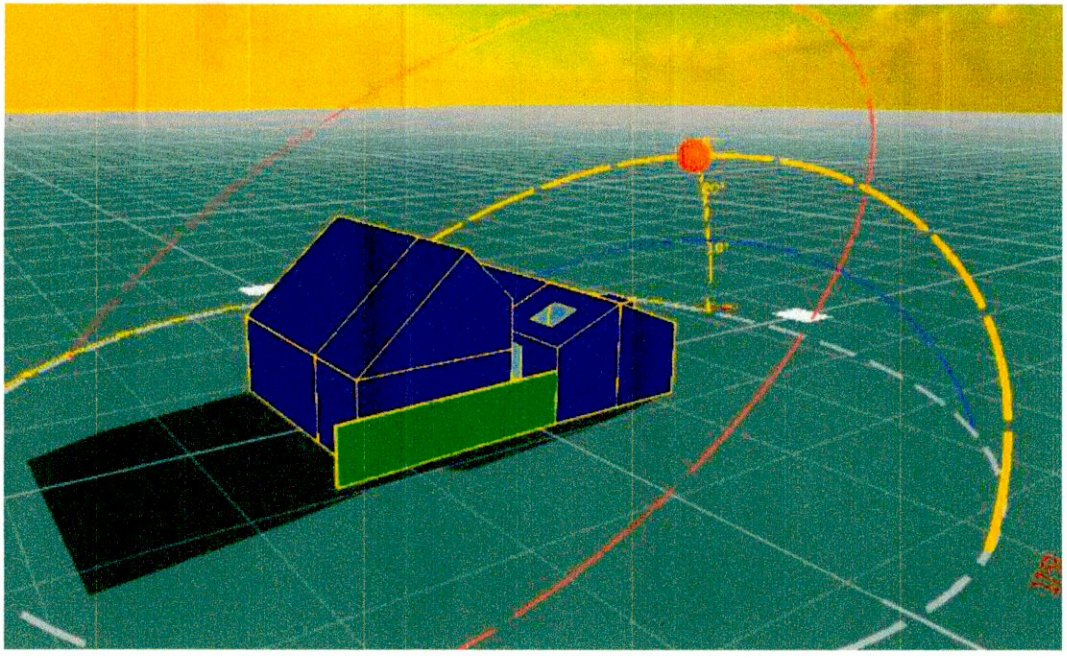

Figure 2: Proposed Building

Figure 2: Proposed Building shows the house with the proposed extension. The skylight can be seen on bedroom 1.

Analysis and Results

Results below are quoted in Daylight Factor.

Daylight factor is a percentage of the outside daylight available.

On a clear overcast day, there would be approx. 10,000 lux outside.

Therefore, every 1 percent represents approx. 100 lux inside during daytime hours.

Existing Building

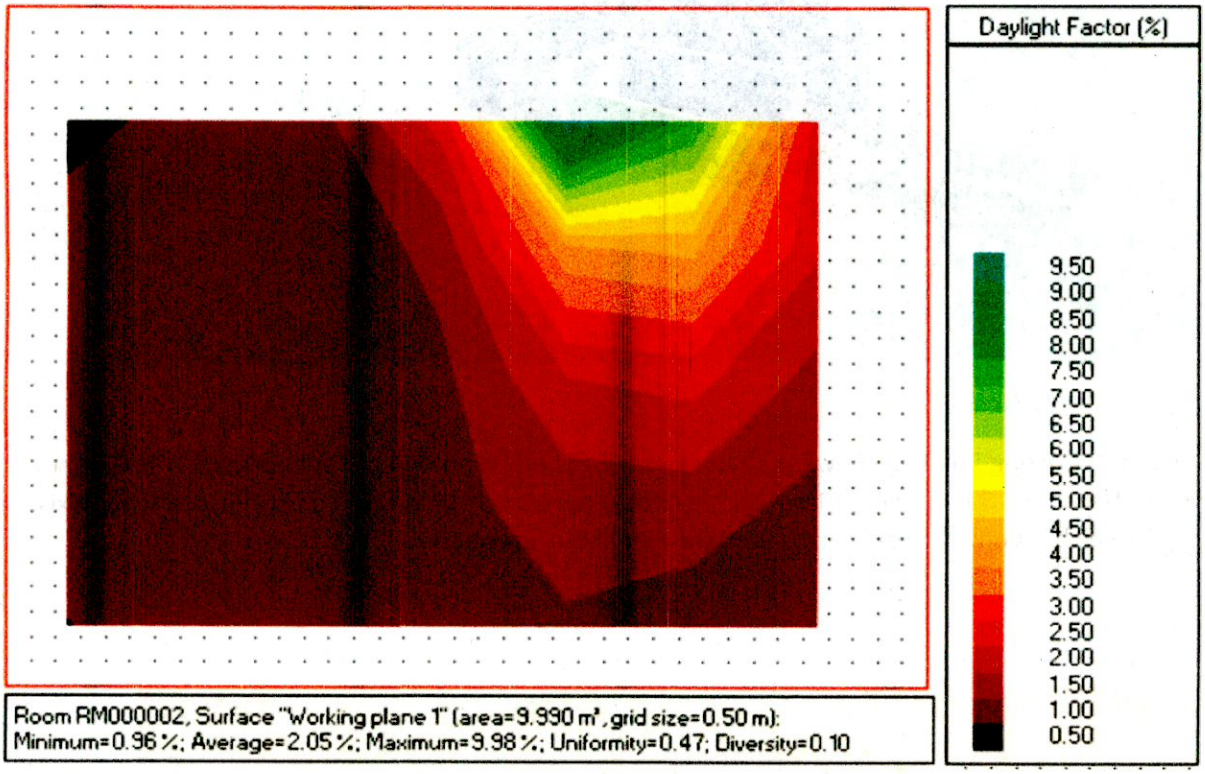

Figure 3: Daylight Factor (Existing)

Figure 3: Daylight Factor (Existing) shows the daylight factor in the bedroom at a height of 0.85m above the ground. There is currently a single window and the brightest part of the room is adjacent to this. It can be seen that daylight factor drops away quickly as we move away from the window and a large area of the room is below 1%. The glazing in the window is only 660mm wide with a thick window reveal and as such is limited in its daylighting potential.

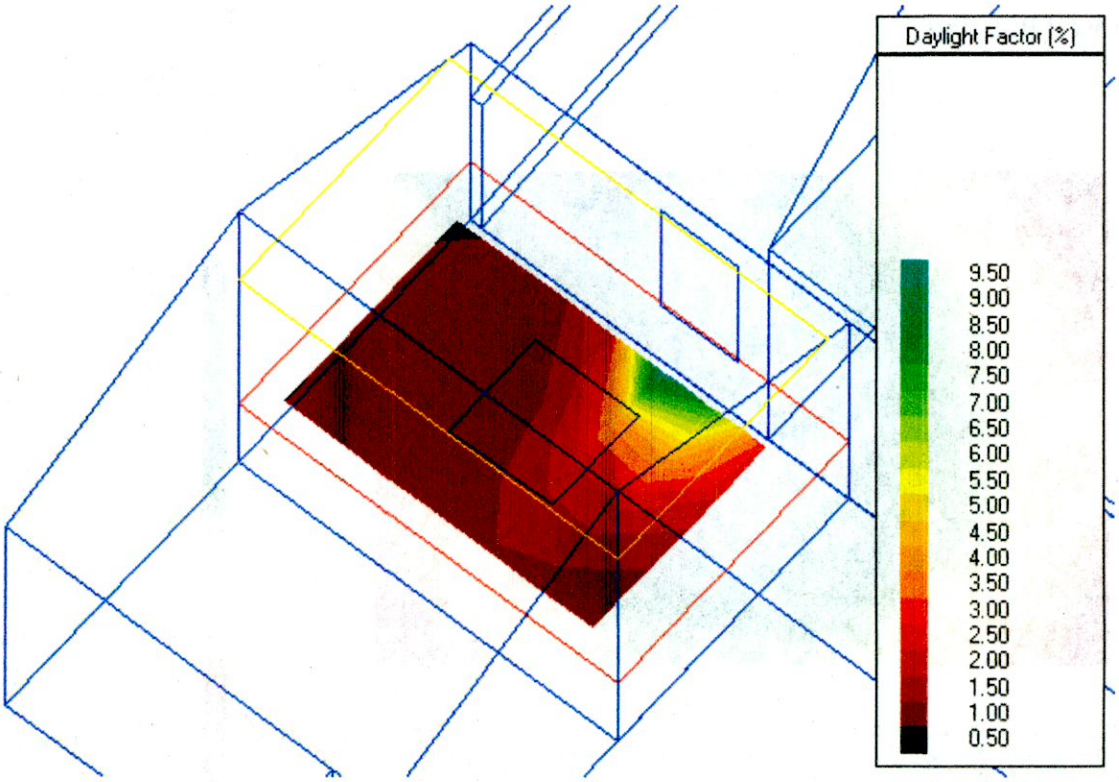

Figure 4: Existing Daylight Factor (3D)

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=9.990m² Margin=0.00 m	Daylight factor	1.1 %	2.1 %	10.0 %	0.51	0.11
	Daylight illuminance	130.49 lux	257.55 lux	1219.54 lux	0.51	0.11
	Sky view	0.00	0.66	1.00	0.00	0.00

Figure 5: Summary of results (Existing)

Proposed Building

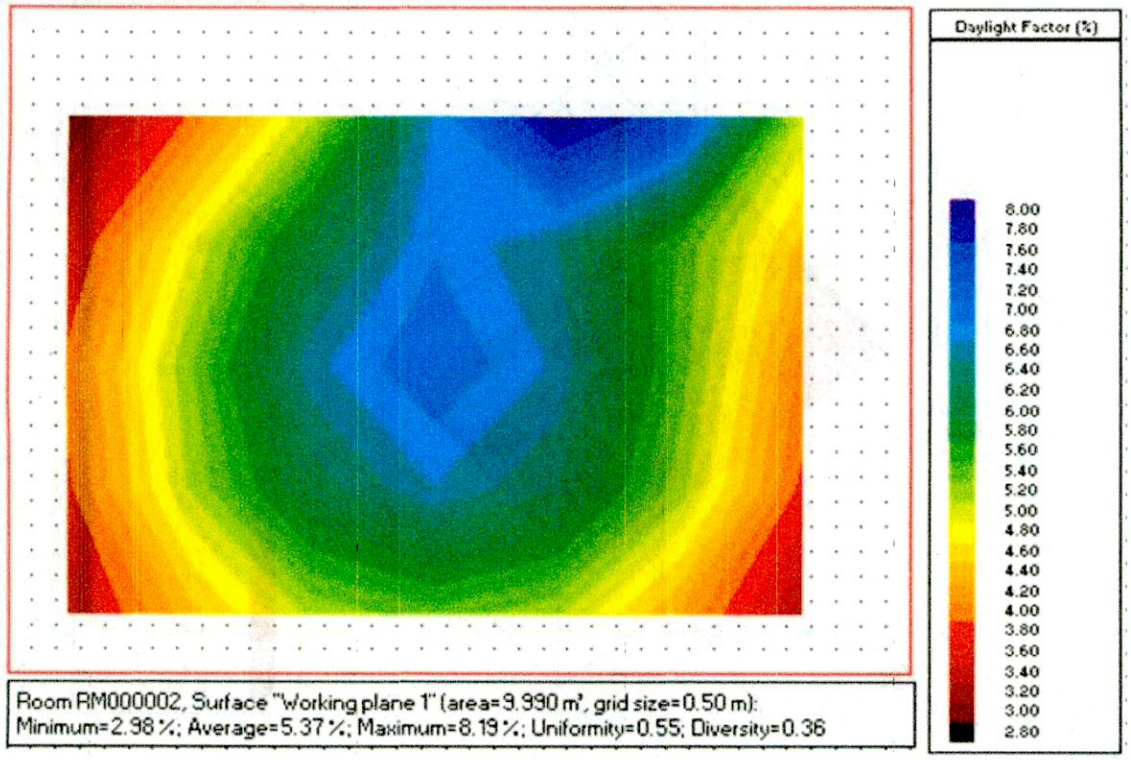

Figure 6: Daylight Factor (Proposed)

Figure 6: Daylight Factor (Proposed) shows the daylight factor in the bedroom at a height of 0.85m above the ground. It can be seen that the daylight factor right beside the existing window has dropped slightly, from 9.5% to 8%. This is due to the proposed new block which will block some light getting in.

However, the skylight has drastically increased the daylight factor throughout the entire room. The centre of the room is now 7% and even the darkest corners of the room are 3%.

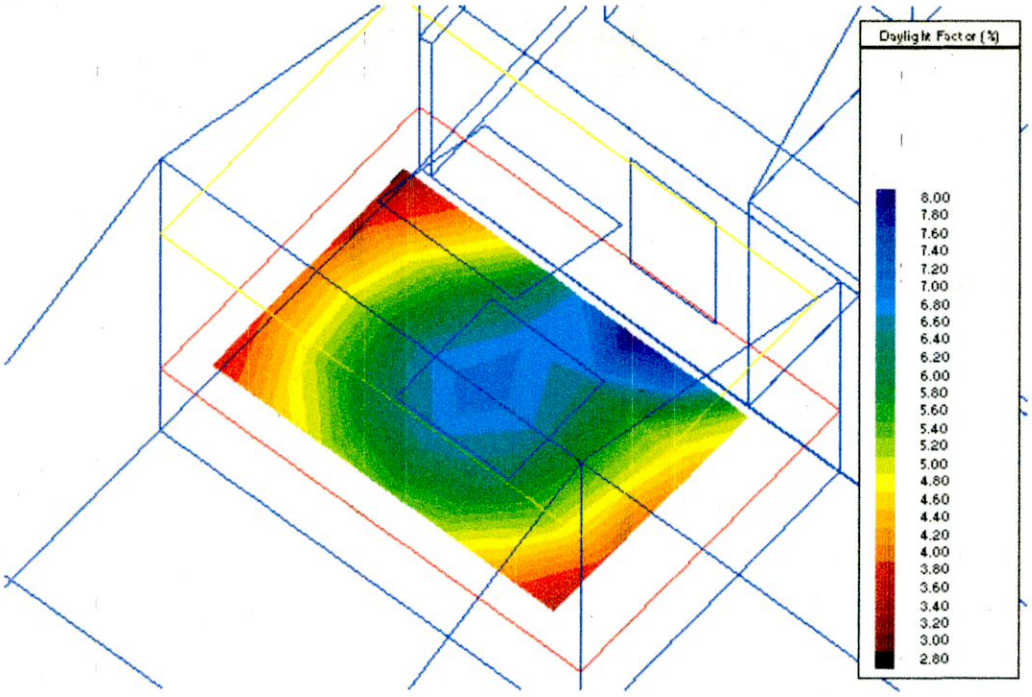

Figure 7: Daylight Factor (Proposed) (3D)

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=9.990m² Margin=0.00 m	Daylight factor	3.0 %	5.4 %	8.2 %	0.55	0.36
	Daylight illuminance	364.04 lux	656.50 lux	1000.54 lux	0.55	0.36
	Sky view	1.00	1.00	1.00	1.00	1.00

Figure 8: Summary of Results (Proposed)

Differences

	Original	New	Change
Minimum	1.1%	3%	Up 1.9%
Average	2.1%	5.4%	Up 3.3%
Maximum	10%	8.2%	Down 1.8%
Diversity	0.11	0.36	Up 0.25

Minimum values up by 1.9%, this means the darkest corners of the room will be almost 200 lux brighter.

Average value is the most important metric, now at 5.4%. This will be a well lit room with ample natural daylight. This value has more than doubled.

Maximum down by 1.8%. This is due to slightly less light coming in at the existing window and being concentrated at one point. The light coming in the new skylight will be spread out by the time it reaches the working plane and therefore doesn't give an increased maximum value but a much improved average value. This is a more desirable spread of light.

Diversity is the ratio of min to max values. A low value shows a poor spread of light. This has improved from 0.11 to 0.36 showing a more even distribution of light.

Actual Lux Level Using Lux Meter

Bedroom 1

Lux levels in the bedroom were measured using a lux meter. Lux levels were also measured on the stairs as this has a north facing skylight and can therefore give some indication as to the levels of light that would be expected from the proposed north facing skylight in the bedroom.

The bedroom is not currently receiving adequate levels of daylight.

85 lux on the window sill and 2.2m into the room in line with window, it dropped to 4 lux.

Figure 9: Bedroom

Figure 10: Window

Figure 11: 85 lux at window sill and 4 lux at bed

Stairs

The light levels on the stairs were measured as it already has a north facing skylight.

The existing skylight has glazing measuring 0.38m by 0.72m, this gives an area of 0.2736m^2.

The proposed skylight for Bedroom 1 measures 1.2m by 1.2m, area of 1.44m^2.

The new bedroom skylight would have over 5 times the area of the skylight in the stairs and would therefore allow roughly 5 times as much light in.

Lux levels at a working plane of 0.85m on the stairs measured 486 lux.

It can be seen that the existing skylight allows for ample daylight and this shows that the north facing orientation of the proposed skylight will not hinder the access to daylight. Also, as the proposed skylight will be 5 times the area of the existing skylight, bedroom 1 will receive plenty of daylight and be far brighter than it is currently.

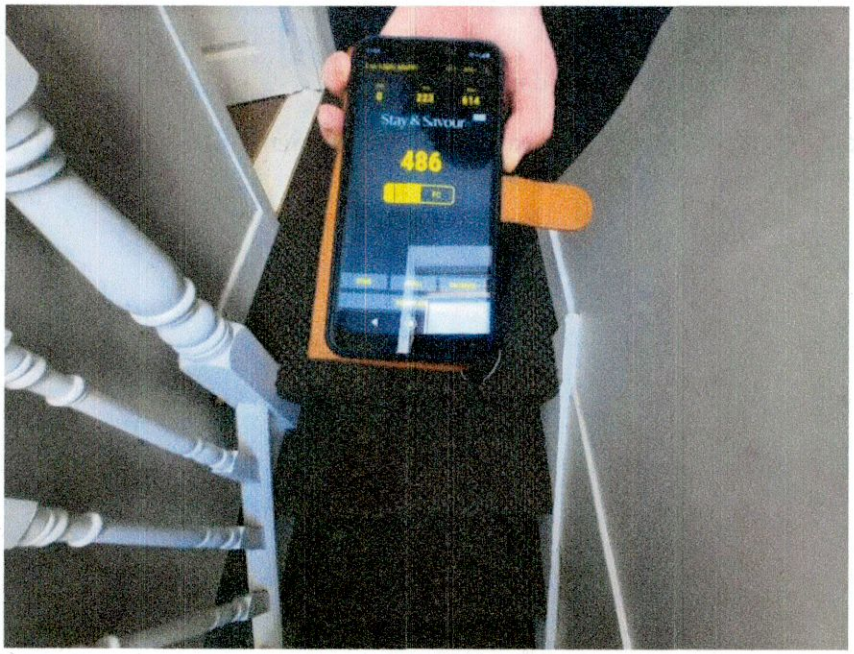

Figure 12: 486 lux under stair skylight

Figure 13: Existing Skylight

Conclusions

Bedroom 1 currently is not receiving adequate natural daylight.

The proposed works to the house including skylight will vastly improve the penetration of daylight into the room, more than doubling the average daylight factor.