Barn Conversion, Black Hole Drove,

Spalding

Internal Daylight and Sunlight Assessment

Elmstead Energy Assessments & Building Services
Suite 3 Aster House, Lanswoodpark
Elmstead Market, Colchester
Essex, CO7 7FD
Registered Company: 11606546

Document Issue Record

This document has been revised and issued as below:

Issue	Date	Comments
1	10.05.2023	Original

Disclaimer

This report has been prepared by EEABS (Elmstead Energy Assessments & Building Services) in accordance with the instructions of their client, for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

Calculations are based on the drawings and information provided to us, which have been accepted in good faith as being accurate and valid. The accuracy of this information may have an impact on any daylight and sunlight assessments carried out.

We have used our best endeavours to ensure that all relevant windows and features of the proposed development and surrounding buildings have been identified.

We can make no guarantee as to the status (successful/unsuccessful) of the planning application following the submission of our report.

EEABS does not accept any liability in negligence for any matters arising outside of the agreed scope of works. Unless otherwise agreed, the copyright of this document and all other Intellectual Property Rights always remain the property of EEABS.

Contents

1.0 Executive Summary 4

2.0 Introduction 5

2.1 The Site and Development Proposal 6

2.2 Planning Policy and Guidance 9

2.3 Methodology 10

2.3.1 Daylight Calculation - Daylight Factor Method 10

2.3.2 Sunlight Calculation - Interior Sunlight 10

3.0 Dynamic Simulation Modelling 11

4.0 Daylight and Sunlight Assessment 12

4.1 Daylight Factors 12

4.2 Interior Sunlight 14

Figures

Figure 1 - Site Plan of Black Hole Drove, Spalding 6

Figure 2 - Proposed Floor Plan 7

Figure 3 - Proposed Elevations 8

Figure 4 - BRE: Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice 9

Figure 5 - BRE Target Daylight Factors 10

Figure 6 - EDSL TAS Computer Model of the Site 11

Figure 7 - Daylight Factor Plot of the Dwelling 13

Appendices

Appendix A - Drawing Register

1.0 Executive Summary

An internal daylight and sunlight assessment has been carried out for the proposed Barn Conversion located at Black Hole Drove, Spalding. This report outlines the results of the assessment in order to assist with the developments planning application.

Calculations have been based on the drawings and information provided to us by the client / architect, internet and OS mapping sources, and publicly available planning records, which have been accepted in good faith as being accurate and valid. The accuracy of this information may have an impact on the daylight and sunlight assessments carried out.

The methodology used for this assessment follows the most recognised guidance document for daylight within dwellings and is titled 'Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice' *Third Edition 2022* and is published by the Building Research Establishment (BRE).

This report has investigated the natural daylight and sunlight received by the proposed new dwellings habitable rooms. The following daylight and sunlight assessments have been carried out with the use of computer modelling software in order to provide the most accurate results possible.

- Daylight Factors
- Interior Sunlight

The daylight factor method results show that all of the habitable rooms would comfortably satisfy the BRE requirements.

The interior sunlight results show that all of the habitable rooms would receive greater than 1.5 hours of sunlight on 21st March, therefore the BRE Guidelines in regard to interior sunlight would also be satisfied.

For these reasons we believe that the proposed Barn Conversion located at Black Hole Drove, Spalding should be considered as acceptable in regard to its amount of natural daylight and sunlight received.

2.0 Introduction

EEABS (Elmstead Energy Assessments & Building Services) were instructed to undertake an internal daylight and sunlight assessment for the proposed Barn Conversion located at Black Hole Drove, Spalding.

The key elements of this report are:

- To review the relevant guidance and methodology with respect to daylight and sunlight that relate to the development.
- Calculate the proposed daylight factor values and interior sunlight hours received within the main habitable rooms of the development.
- To summarise and compare the findings against regulation guidelines for daylight and sunlight within new properties.

2.1 The Site and Development Proposal

The site is located at at Black Hole Drove, Spalding and can be seen outlined in red on the Site Plan below.

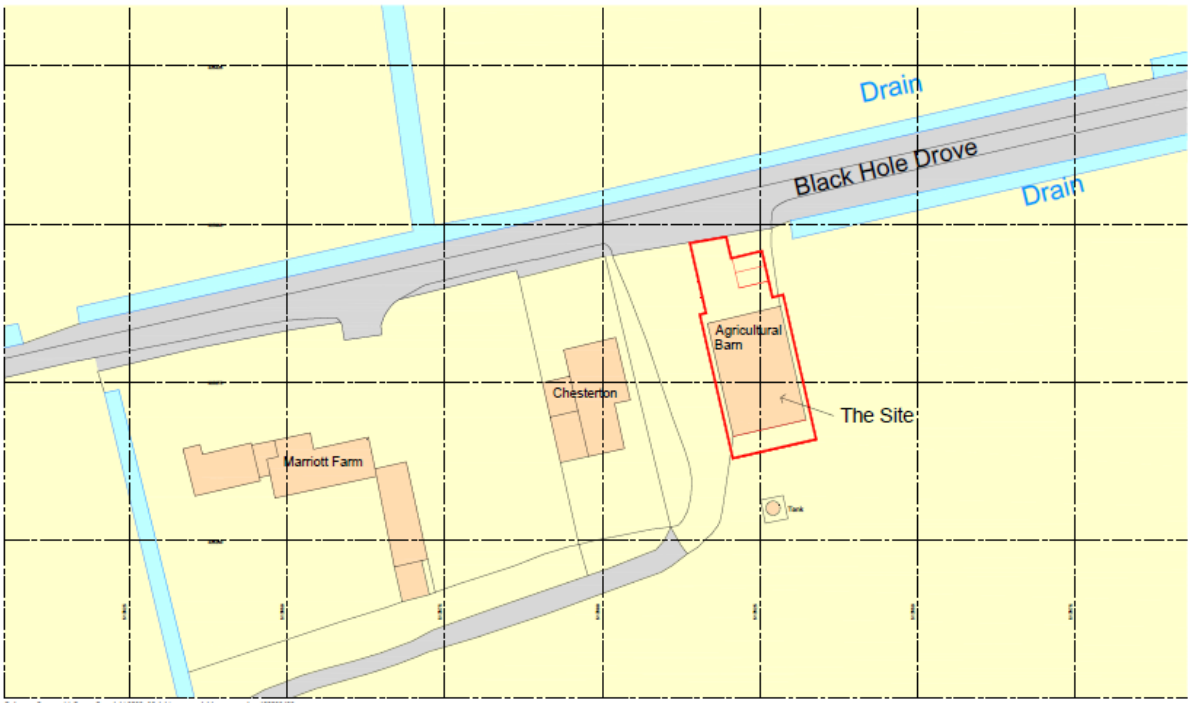


Figure 1 - Site Plan of Black Hole Drove, Spalding

The proposal is for the conversion of the existing barn into a new 3 bedroom dwelling. This assessment has investigated the daylight and sunlight received by each of the habitable rooms.

Floor Plans and Elevations of the proposed scheme can be seen in figures 2 and 3 below.

This assessment has been based on the drawings and information provided to us by the client / architect, internet and OS mapping sources, and any publicly available planning records. A drawing register can be found within Appendix A.

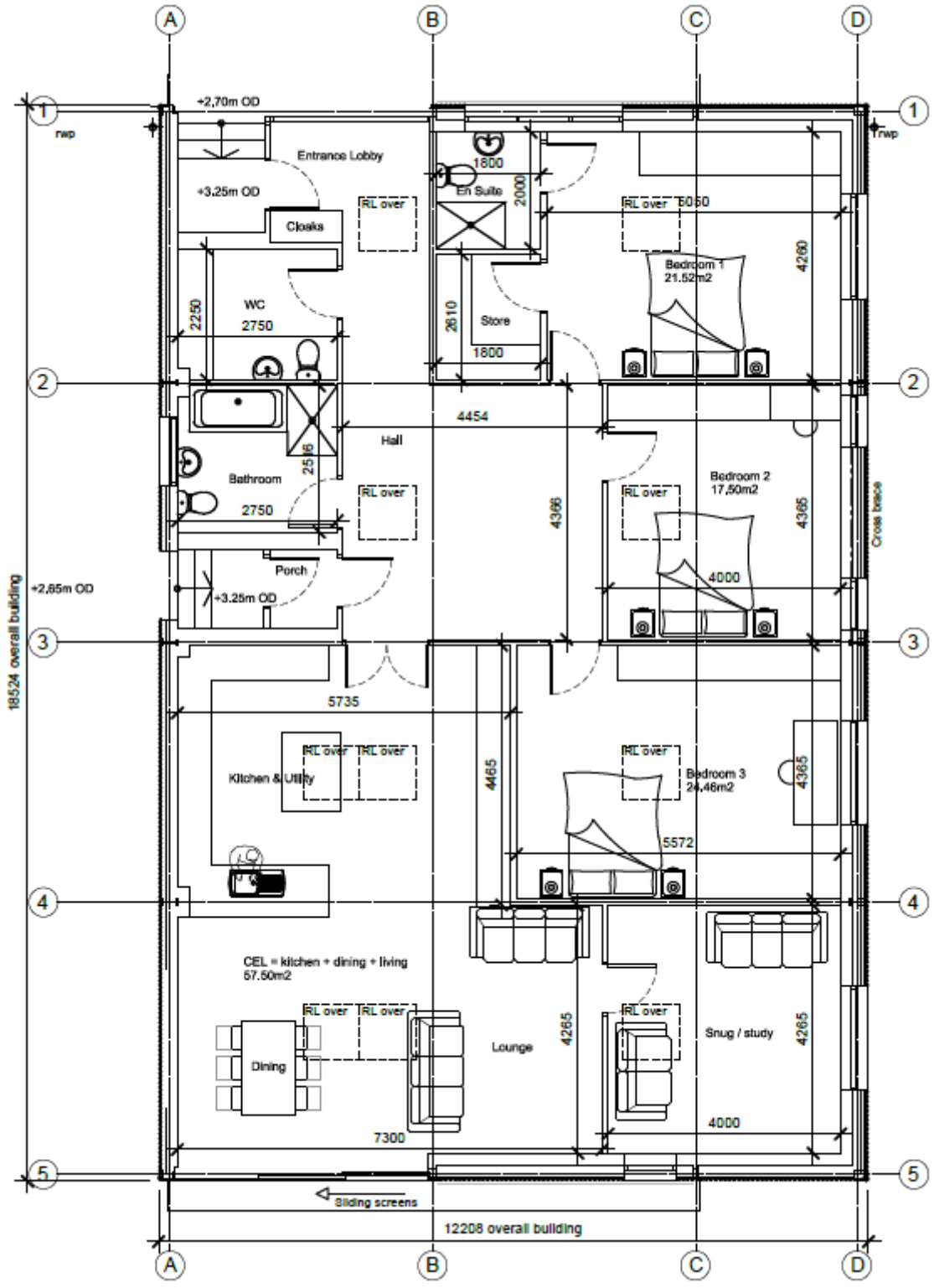
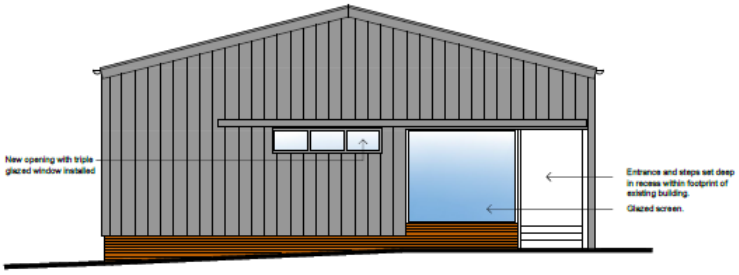
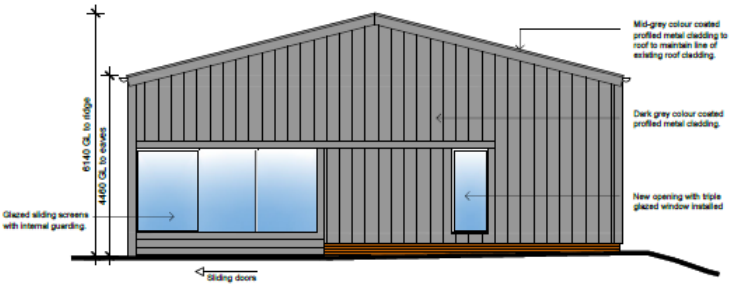


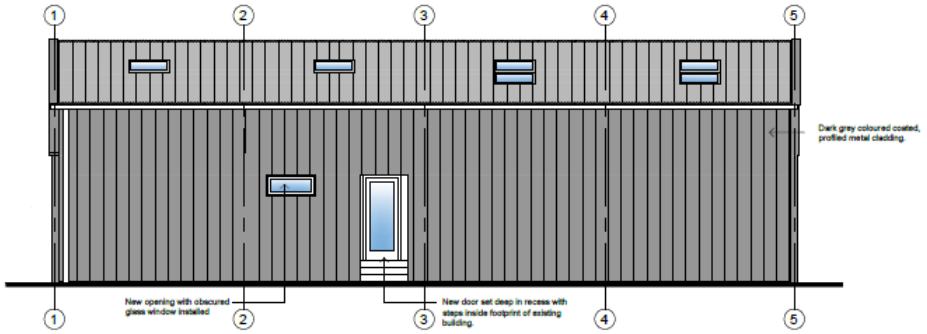
Figure 2 - Proposed Floor Plan



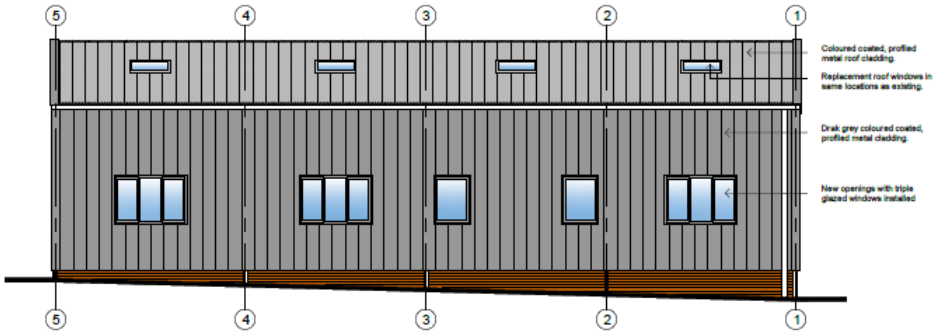
North Elevation as proposed
Scale 1:100



South Elevation as proposed
Scale 1:100
Ground levels shown indicative only.



West Elevation as proposed
Scale 1:100



East Elevation as proposed
Scale 1:100

Figure 3 - Proposed Elevations

2.2 Planning Policy and Guidance

The most recognised guidance document for natural light within dwellings is titled 'Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice' *Third Edition 2022* and is published by the Building Research Establishment.

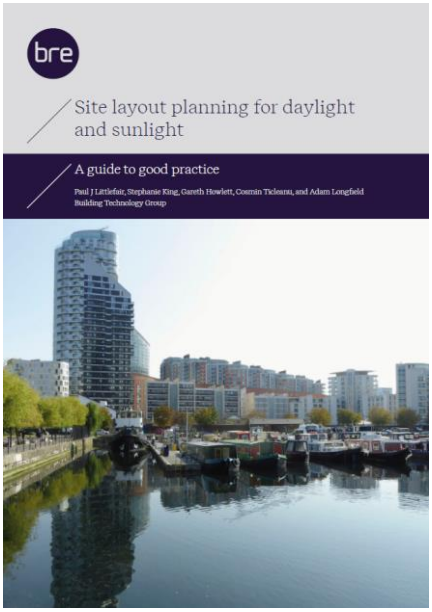


Figure 4 - BRE: Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice

Although the BRE guide clearly states that its recommendations are not mandatory and the document should not be considered as an instrument of planning policy, it can be used in conjunction with the British Standard BS EN 17037.

While the BRE Guidelines are the most recognised document for natural light within dwellings they also do state that:

"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. In special circumstances the developer or planning authority may wish to use different target values."

Absent of any particular planning requirements, the methodology and target benchmarks set out within the BRE guide have been used to assess the daylight and sunlight received.

Any trees located close to proposed development have been excluded from the model as recommended by the BRE Guide, which states:

“Normally trees and shrubs need not be included, partly because their shapes are almost impossible to predict, and partly because the dappled shade of a tree is more pleasant than the deep shadow of a building”.

2.3 Methodology

The following methodology and calculations set out within the BRE Guide 'Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice' *Third Edition 2022* were used to carry out the daylight and sunlight assessments for the proposed dwelling.

2.3.1 Daylight Calculation - Daylight Factor Method

The daylight factor is the ratio of the illuminance at a point on the working plane in a room, divided by the outside illuminance on a horizontal surface under a CIE overcast sky. The ratio is usually expressed as a percentage and guidance for adequate levels of daylight, for different UK Cities, are laid out within the standard BS EN 17037 and referenced within Table C3 of the BRE guide.

Table C3 – Target daylight factors (D_T) to achieve over at least 50% of the assessment grid in UK domestic habitable rooms with vertical and/or inclined daylight apertures

Location	D_T for 100 lx (Bedroom)	D_T for 150 lx (Living room)	D_T for 200 lx (Kitchen)
St Peter (Jersey)	0.6%	0.9%	1.2%
London (Gatwick Airport)	0.7%	1.1%	1.4%
Birmingham	0.6%	0.9%	1.2%
Hemsby (Norfolk)	0.6%	0.9%	1.3%
Finningley (Yorkshire)	0.7%	1.0%	1.3%
Aughton (Lancashire)	0.7%	1.1%	1.4%
Belfast	0.7%	1.0%	1.4%
Leuchars (Fife)	0.7%	1.1%	1.4%
Oban	0.8%	1.1%	1.5%
Aberdeen	0.7%	1.1%	1.4%

Figure 5 - BRE Target Daylight Factors

As detailed plans have been provided for the proposed new development, the daylight factor calculation will be carried out on the habitable rooms as recommended by the BRE Guide.

"To Check that adequate daylight is provided in new rooms, daylight factor or interior illuminance may be calculated and compared with the recommendations in BS EN 17037 Daylight in Buildings".

For this development, Hemsby (Norfolk) is considered to be the nearest location and therefore Bedrooms should achieve 0.6%, Living Rooms should achieve 0.9%, and Kitchens should achieve 1.3% generally over at least 50% of the assessment grid.

2.3.2 Sunlight Calculation - Interior Sunlight

BS EN 17037 and the BRE Guide recommends that at least one main window wall should face within 90° of due south and a habitable room, preferably a main living room, should receive a minimum of 1.5 hours of direct sunlight on 21st March in order to appear as reasonably sunlit.

3.0 Dynamic Simulation Modelling

EDSL TAS Dynamic Simulation Modelling software was used to carry out the daylight and sunlight calculations, as this can provide a more accurate means of assessment over the 'by hand' indicator methods outlined within the BRE guide.

The daylight calculations are carried out under a standard CIE overcast sky. For the sunlight calculations, the computer model uses actual hourly weather data for the proposed location, in this instance CIBSE Norwich TRY weather data was used.

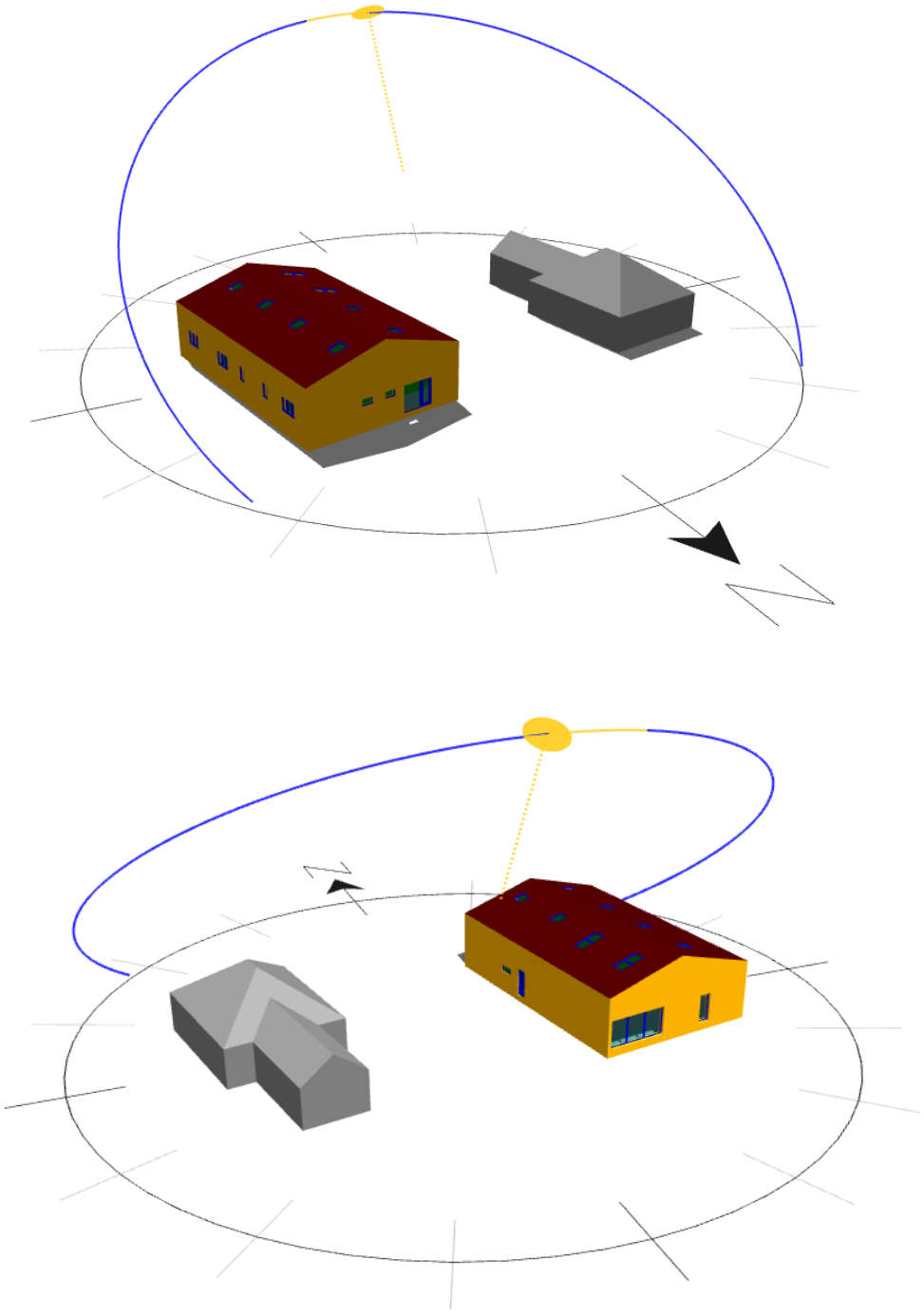


Figure 6 - EDSL TAS Computer Model of the Site

4.0 Daylight and Sunlight Assessment

4.1 Daylight Factors

For the daylight factor calculation, the windows were assumed to be clear glazing with a light transmittance value of 0.68. The working plane height was assumed to be 0.85m with an assessment grid excluding a band of 0.3m from the walls as recommended.

The internal light reflectance's of the floors, walls and ceilings were assumed to be typical values of 0.40, 0.70 and 0.80, respectively. (Each surface/paint colour has its own light reflectance value ranging from 0 - 1, with black being on the low end of the scale around 0.05 and white being on the high end around 0.90).

Room	Target Daylight Factor (%)	% Of Room Assessment Grid over Target Factor (%)	Result (50% is the Pass Mark)
Kitchen Living Dining	1.30	100.00	Above Target
Snug / Study	0.90	100.00	Above Target
Bedroom 1	0.60	100.00	Above Target
Bedroom 2	0.60	100.00	Above Target
Bedroom 3	0.60	100.00	Above Target

The daylight factor method results show that all of the habitable rooms would comfortably satisfy the BRE requirements.

A daylight factor plot of the proposed dwelling can be seen below.

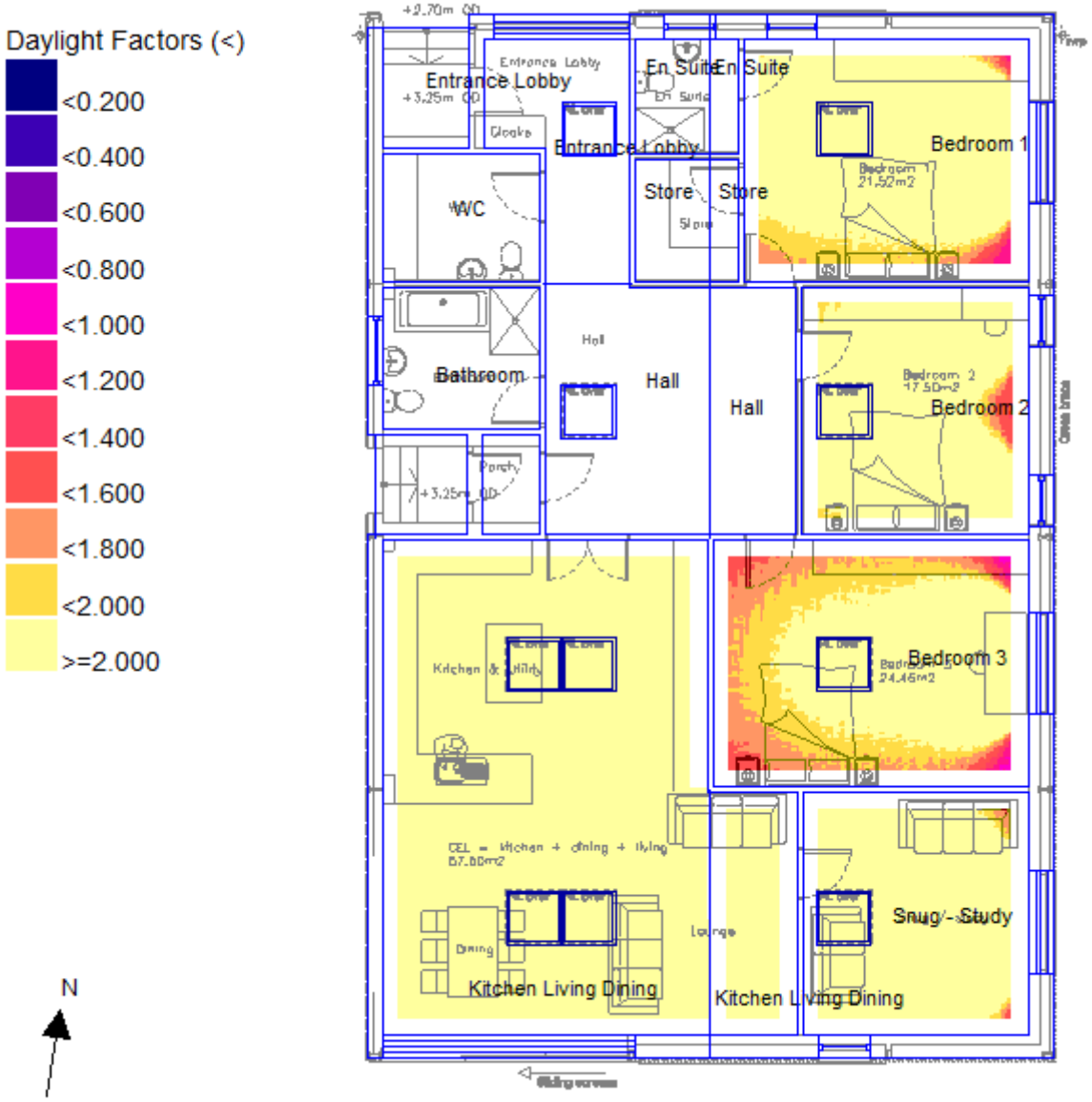


Figure 7 - Daylight Factor Plot of the Dwelling

4.2 Interior Sunlight

For the interior sunlight calculation at least one habitable room (although preferably a main living room) should receive at least 1.5 hours of sunlight on 21st March. The amount of sunlight received by each habitable room can be seen below.

Room	Target Sunlight Hours	Hours of Sunlight Received	Result
Kitchen Living Dining	1.50	7.83	Above Target
Snug / Study		7.83	
Bedroom 1		7.42	
Bedroom 2		7.42	
Bedroom 3		7.42	

The interior sunlight results show that all of the habitable rooms would receive greater than 1.5 hours of sunlight on 21st March, therefore the BRE Guidelines in regard to interior sunlight would be satisfied.

Appendix A - Drawing Register

Drawing No.	Drawing Title
A1531-01	Site Location and Block Plan
A1531-04	As Existing Plans, Sections, and Elevations
A1531-05	As Existing Sections
A1531-14-P1	As Proposed Plans and Elevations
-	Topographical Survey
-	Site Photos