

DAYLIGHT AND SUNLIGHT ANALYSIS

MILDMAY HOOK LANE, CHICHESTER PROPOSED RESIDENTIAL DEVELOPMENT

21 November 2017



1. Summary

In considering the development potential and the quality of amenity space for the surrounding properties – especially The Nook – once the scheme has been implemented, an analysis of daylight and sunlight assessment was carried out in accordance with the “ Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice” by BRE 2011.

The BRE Guide is intended for designers, clients consultants and planning officials.

In the case of Mild May, there is no significant reduction in light to the windows of the neighbouring properties, The Nook is still slightly above the standards set out in the BRE guide, meaning that the occupants of the Nook will not notice any difference in daylight from the ground floor windows.

When analysing the sunlight available to The Nook, the results prove that they have adequate provision throughout the year, according to the recommendations of the guide.

2. Introduction

The new proposed development at Mild May, Hook Lane, Aldingbourne, PO20 3TE has been assessed in accordance with the “Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice”, by BRE 2011 with the sunlight analysis made in Revit software.

The new proposed development is a single-family home with carport to the front.

The method used in this calculation, assess the impact of the new development, and is outlined in this report, together with the result and conclusions.

In relation to sunlight, the criteria given, calculates the annual sunlight hours (APSH) which considers the amount of sunlight available in both the summer and winter for the façade which faces the proposed development.

Multi-solar studies have been carried out on the existing and the proposed buildings, as well to show the shadowing effects in summer and winter time. Summer is considered to be between 21st June to 21st September and winter is considered between 21st December and 19th March.

These periods have been chosen to highlight the shortest and the longest day of the year and the sun-path of a 3-month period.

Furthermore, figures identify the variation in different months, for the existing and proposed properties which demonstrate the small difference of the impact of the proposed dwelling.

3. Method of assessment

General

Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice is intended for building designers, clients, consultants and planning officials and provide guidance on site layout to provide good natural lightning within a new development; safeguarding of daylight and sunlight within existing building nearby; and the protection of day-lighting of adjoining land for future development.

It is important to note that the advice given in the BRE report is not mandatory. Specifically, in the introduction to the report it states that:

“The guide is intended for building designers and their clients, consultants and planning officials. The advice given 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. 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.”

The BRE guide states that the guidelines are to be used for adjoining/adjacent dwellings where daylight is required including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, store rooms and circulation spaces and garages need not be analysed.

Detailed guidance for daylight

The BRE guidelines provide three main methods of calculation for daylight/sunlight.

Preliminary Check 1 – The guide provides preliminary guidance and looks at the distance between the new development and the existing buildings being analysed and addresses whether the existing building still receives enough skylight. If the distance between the buildings is 3 times the height difference between the ground floor window and the top of the new development then the loss of light need not be analysed as the loss of light will be small. If the distance is less than 3 times the height difference a modified form of the procedure is adopted.

Preliminary Check 2 - A section is drawn of the existing buildings and proposed development and a line is drawn perpendicular from the ground floor window centre, and another drawn from the window to the top of the development. If this exceeds the recommended value of 25° from the centre of the window being assessed then the window is deemed to be at risk of losing light. If this is the conclusion then the Vertical Sky Component (VSC) then has to be calculated.

VSC - The BRE Guide criteria states “if the calculated Vertical Sky Component is greater than 27% then enough skylight should still be reaching the window of the existing building. Any reduction below this should be kept to a minimum. If the VSC with the new development in place is both less than 27% and less than 0.8 times its former value occupants of the existing building will notice the reduction in the amount of skylight. The area lit by the window is likely to appear more gloomy and electric lighting will be needed more of the time”.

Detailed guidance on sunlight

The BRE guide advises that in residential properties, the main requirement for sunlight is in the living room and is valued at all times of the day. Conservatories are also deemed to require sunlight, however bedrooms and kitchens are viewed as less important.

Winter sunlight is also considered, due to the warming affect it can have on properties and therefore reduces space heating loads. In new developments, care should be taken to safeguard the sunlight to existing properties as people may notice the loss of sunlight to their homes and if extensive it will usually be resented.

With regard to assessing the levels of sunlight, the BRE report gives recommendations that it is only those windows that face within 90 degrees of due South, will enjoy significant amounts of sunlight therefore assessments are required for these windows only. This has been measured with the 3D Revit model which will show the actual shadows on the South façade of the building.

The garden spaces of the residential properties have not been assessed.

4. Site

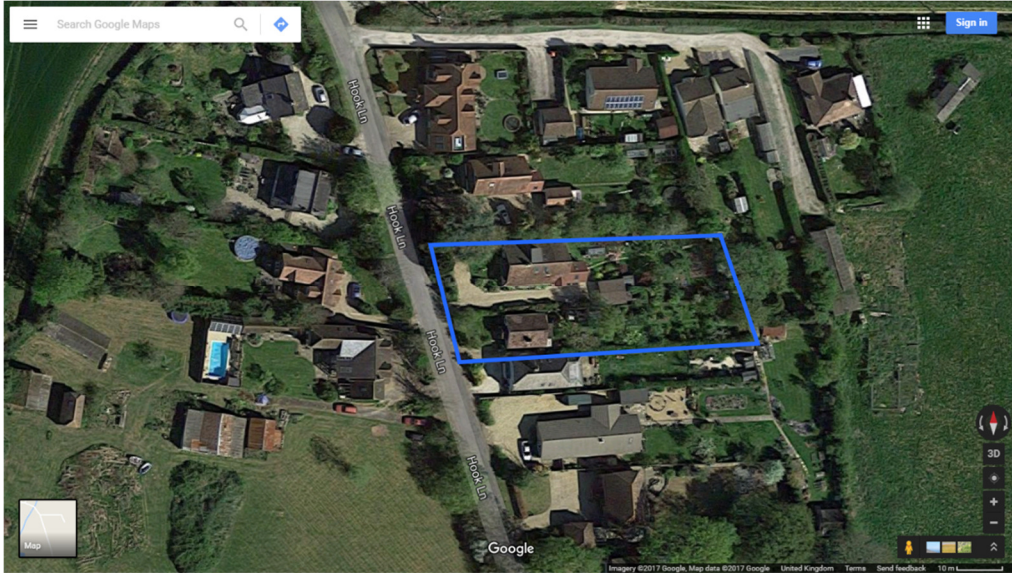


Figure 1 Current site

The site located in Hook Lane, Aldingbourne. The blue line indicates the proposed site – Mild May and the neighbouring property – The Nook - positioned on the North from the proposed site.

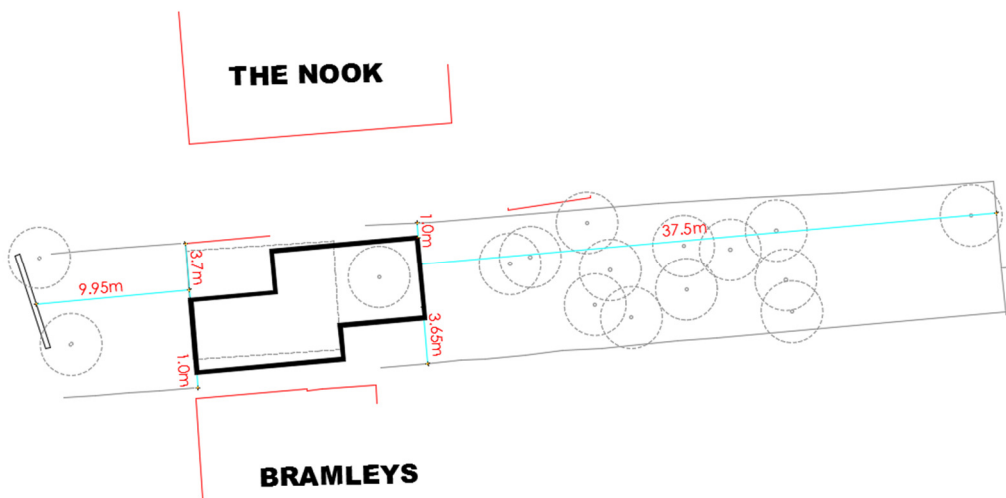


Figure 2 Proposed Site Plan

Affected residence

The building that could be affected by the new proposed development is located 7m to the North of the development and has windows that would face the proposed building. The Nook is a residential property, of single storey height however has the benefit of a possible loft conversion – apparent by skylights.



Figure 3 The Nook

5. Model

To analyse the potentially effected building, a 3D model has been constructed in Revit to represent the existing building, the proposed building and the relation with the affected building.

The Conceptual Mass has been created by using the Topographical Survey produced by Medlams Surveys Limited.

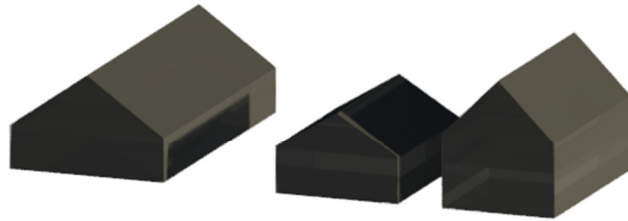


Figure4 Existing model front

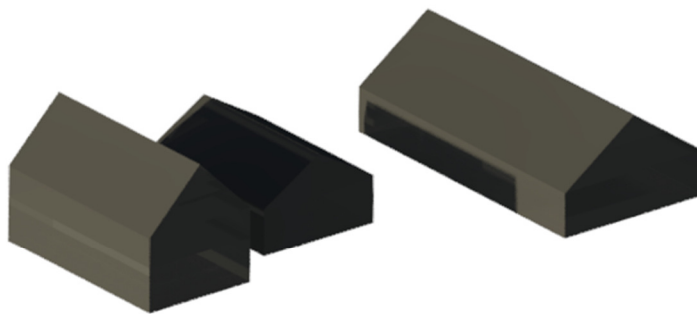


Figure 5 Existing model rear

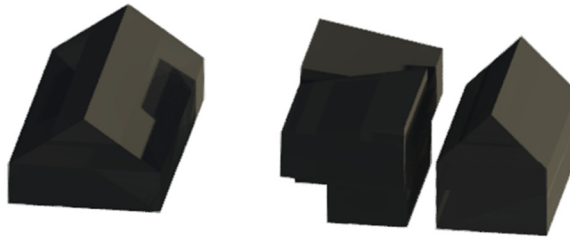


Figure 6 Proposed model front

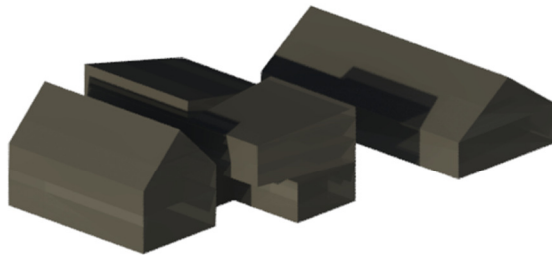


Figure 7 Proposed model rear

6. Daylight Analysis

Preliminary Check 1

“Loss of light to existing windows need not to be analysed if the distance of each part of the new development from existing window is three or more times its height above the centre of the existing window.”

When considering the preliminary review suggested by BRE we can conclude the following:

There is 3.966m height difference between the ground floor window in The Nook and proposed mild May. 3 times this is 11.898m. The actual horizontal separation is 7m therefore further analysis is required.

Preliminary Check 2

“If the angle drawn from the ground floor window to the uppermost part the proposed building is less than 25°, the loss of daylight will be small.”

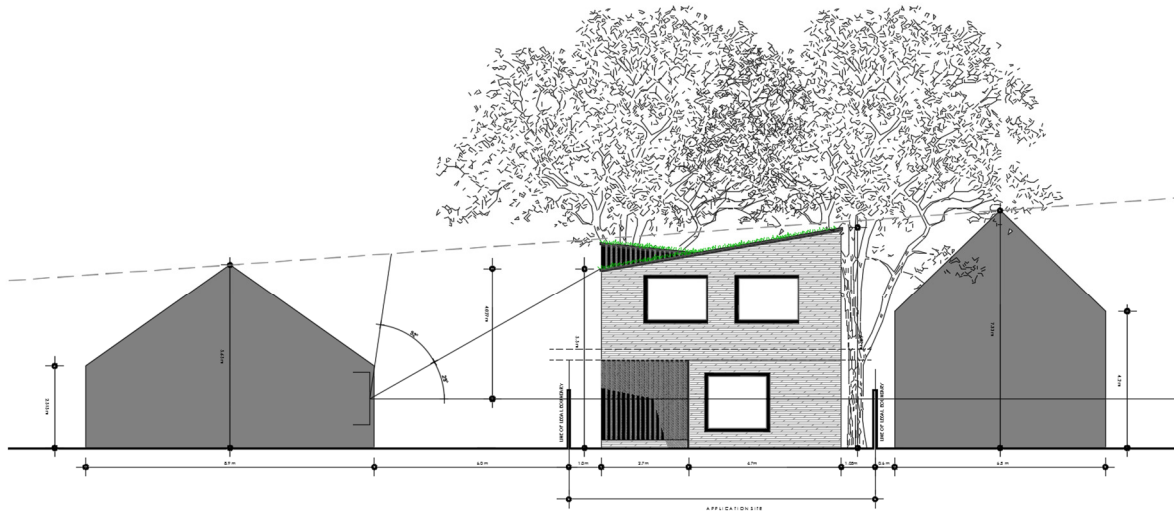


Figure 8 Preliminary check diagram 25-degree angle check

When considering the preliminary review suggested by BRE we can conclude the following:

The angle between the ground floor window and the proposed dwelling roof is 29°, which is slightly excess of the 25° guidance angle suggested by BRE therefore the reduction angle will be small, but to provide a better understanding of the impact that the proposed building would have on the existing property on the North, further analysis has been carried out.

Vertical Sky Component (VSC)

Following the BRE guidance and using Waldrum Diagram VSC the following calculation has been produced.

“If the window has a VSC of 27% or greater it is deemed that the window should be receiving enough sky-light. If the VSC value is below the 27% then this value should be calculated against the previous daylight potential. If the difference is no less than 0.8 times its former value, or 80%, then it is deemed that occupants of the existing buildings will not notice the reduction in light.”

The VSC result shows that there is no significant reduction because the Walgram diagram provides a calculation of 27.1% Vertical Sky Component.

7. Average daylight factor

Following the BRE guidance the affected rooms may be checked using the Average Daylight Factor (ADF) which measures the overall amount of daylight in a room.

“In housing BS 8206-2 also gives a minimum value of ADF of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms.”

$$ADF(\%) = \frac{TMAw\theta}{A(1-R^2)}$$

T: diffuse visible transmittance of the glazing, 0.68 can be used

M: maintenance factor

Aw: the net glazed area of the window in m²

A: the total area of room surfaces including walls, windows, ceilings, floors

R: average reflectance, for light coloured room 0.5 can be taken

However, as floorplans of ‘The Nook’ are not available an ADF calculation has been made with 2 different scenarios.

- Set-up 1: one big room located to the front of the building



Figure 9 One room

$ADF = (0.68 \times 1 \times 6.809 \times 55) / (155 \times 0.25) = 2.19\%$
 height)

(If the room is 4.2x10m with 2.5 ceiling

The room would have the recommended daylight factor even if the kitchen is located in this area.

- Set-up 2: There are two rooms (living and bedroom) located in the investigated area



Figure 10 Living room and bedroom

Living room is located within the front area (red line):

$ADF = (0.68 \times 1 \times 4.892 \times 55) / (94 \times 0.25) = 2.57\%$

(If the room is 4.2x5.5m with a 2.5m ceiling height;
 recommendation for living room: 1.5%)

The room would have the recommended daylight factor even if the kitchen is located in this area.

Bedroom situated between the front room and the porch (green line):

$ADF = (0.68 \times 1 \times 1.917 \times 55) / (94.7 \times 0.25) = 1.01\%$

(If the room is 4.2x5.5m with 2.5m ceiling height;
 recommendation for living room: 1.0%)

8 Shadow comparison, multi-solar study

Software allows users to gain a true view of shadows and sun-paths in 3D, multiply data extracts have been taken and attached further as evidence, the proposed building would NOT have significant impacts on the existing neighbouring property placed to the North.

Below, the model compass points are annotated, which highlights the time of Sunrise & Sunset and the actual position of the Sun and sun-path.

The existing model has been indicated in blue, with the proposed building in grey.

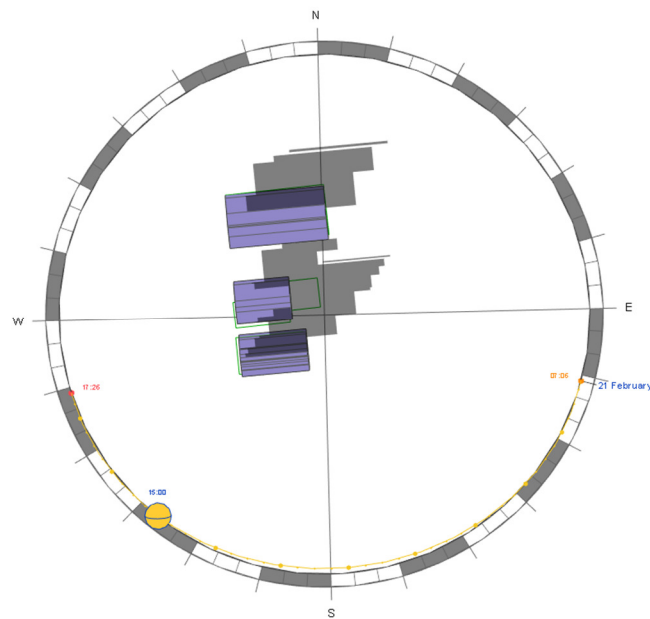


Figure 11 21 of February 3PM, existing model

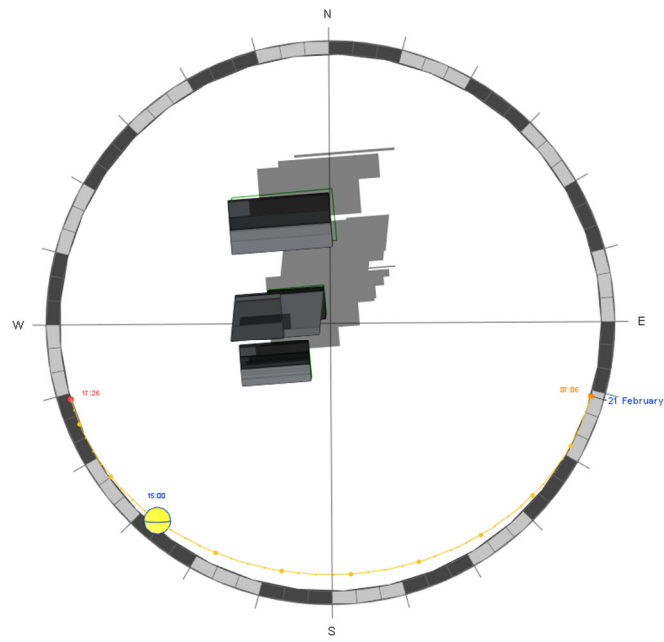


Figure 12 21 of February 3PM proposed model

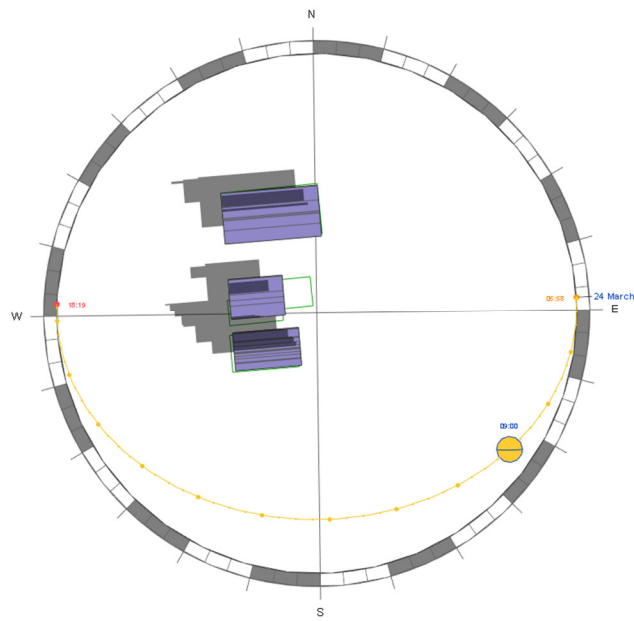


Figure 13 24 of March 9AM, existing model

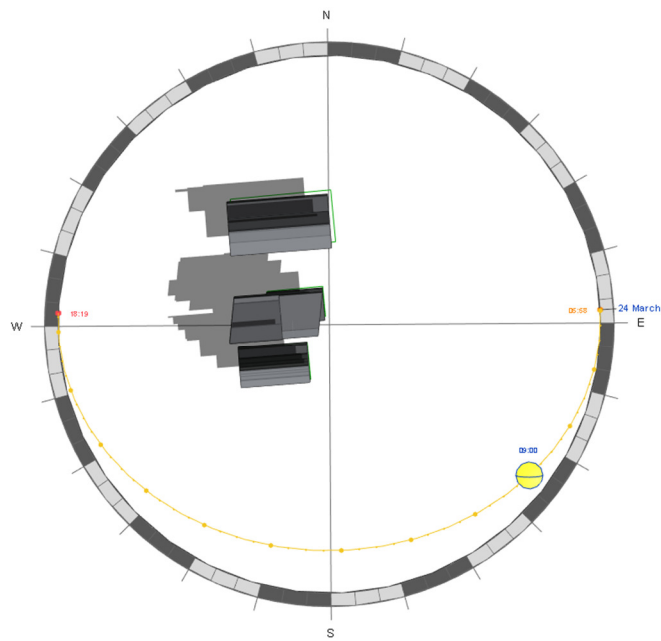


Figure 14 24 of March 9AM, proposed model

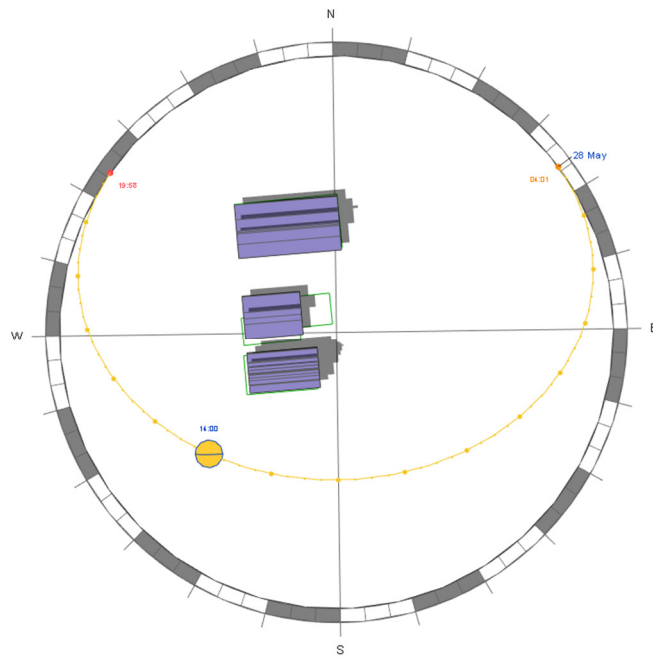


Figure 15 28 of May 2PM, existing model

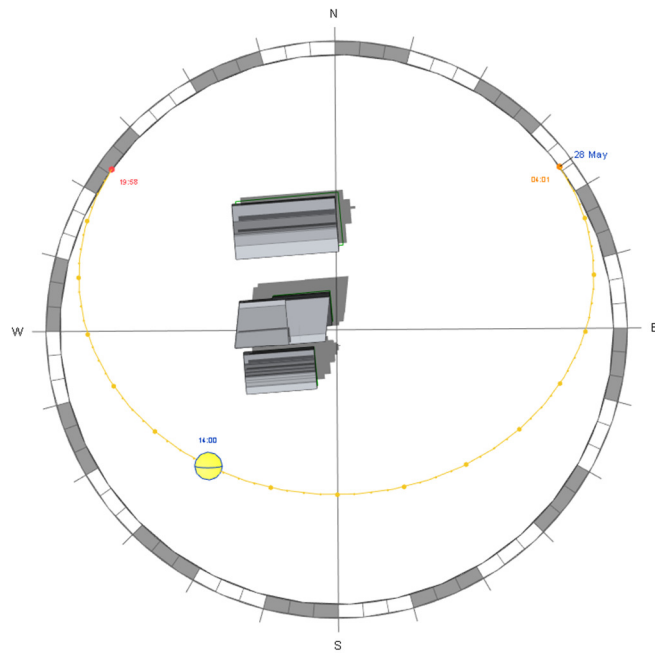


Figure 16 28 of May 2PM, proposed model

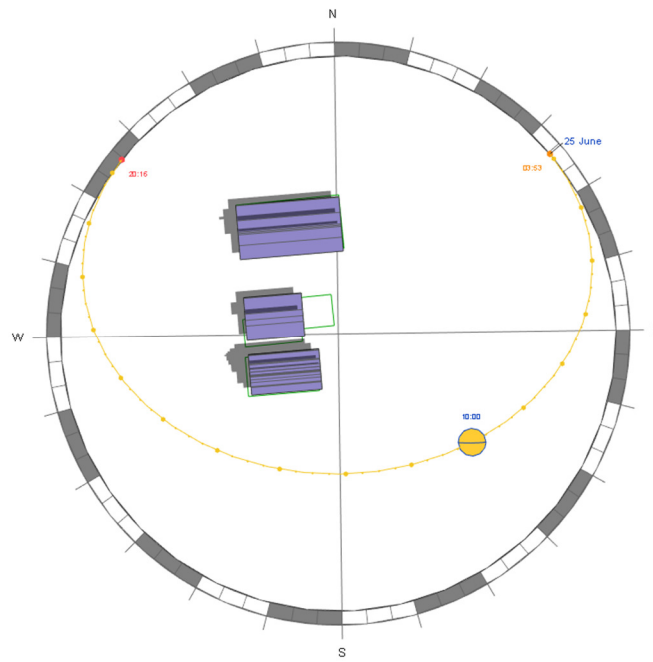


Figure 17 25 of June 10 AM, existing model

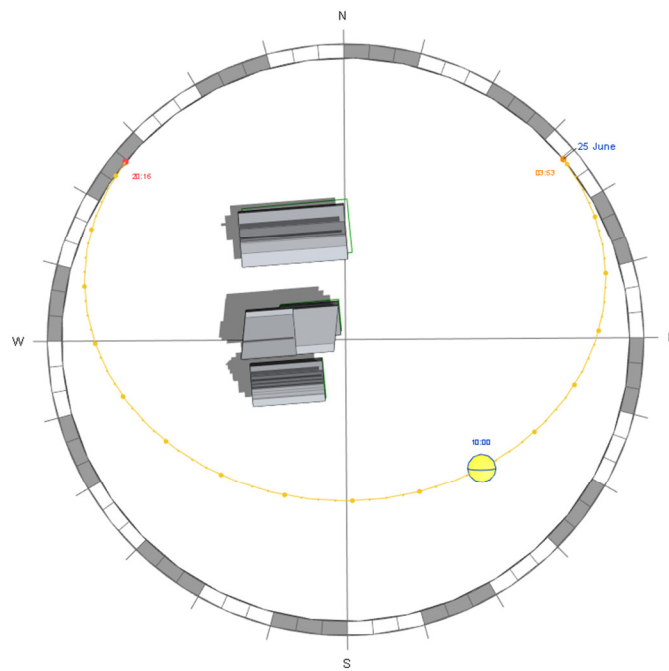


Figure 18 25 of June 10AM, proposed model

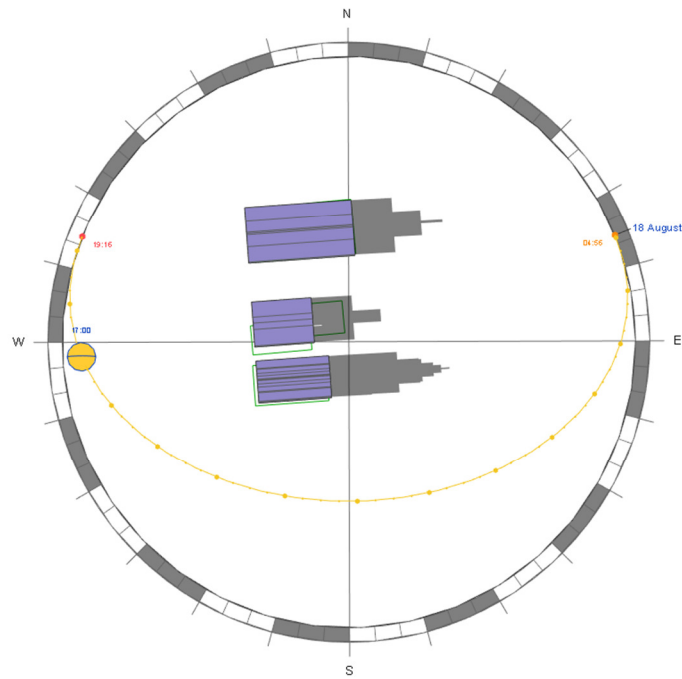


Figure 19 18 of August 5PM, existing model

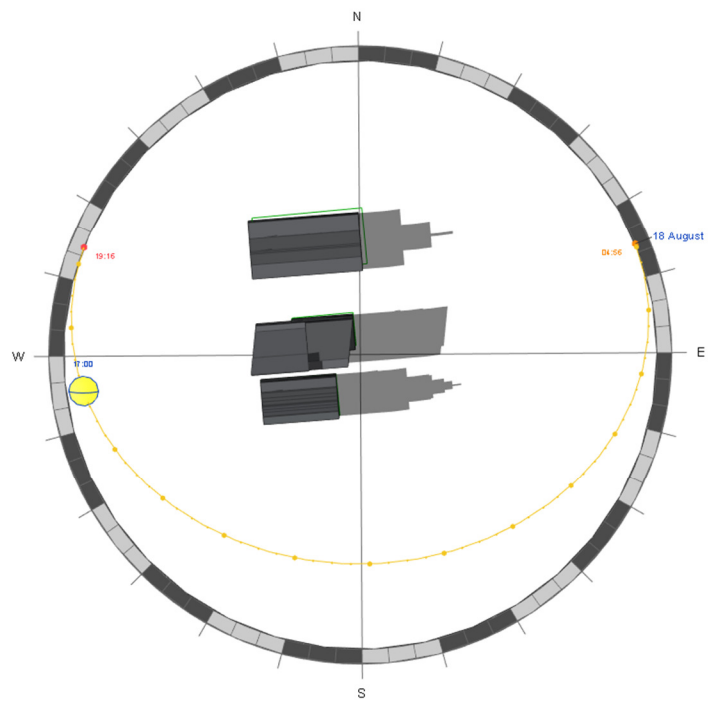


Figure 20 18 of August 5PM, proposed model

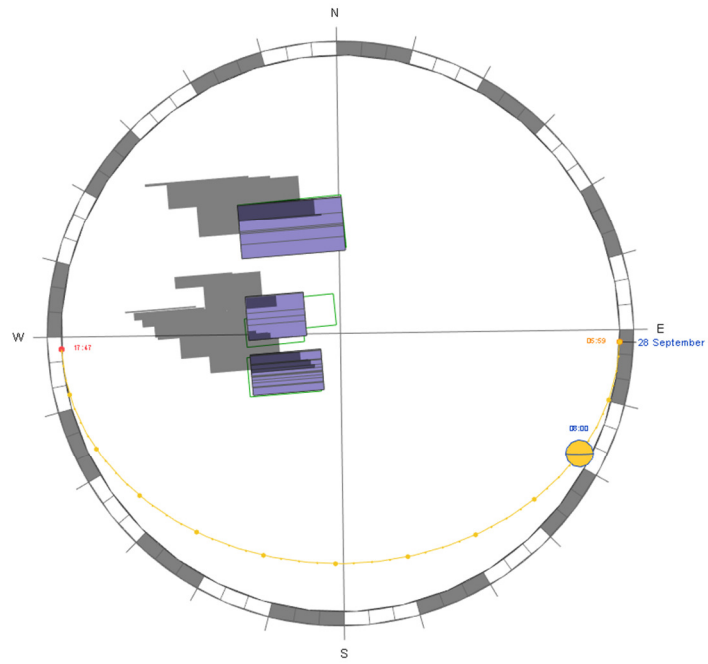


Figure 21 28 of September 8AM, existing model

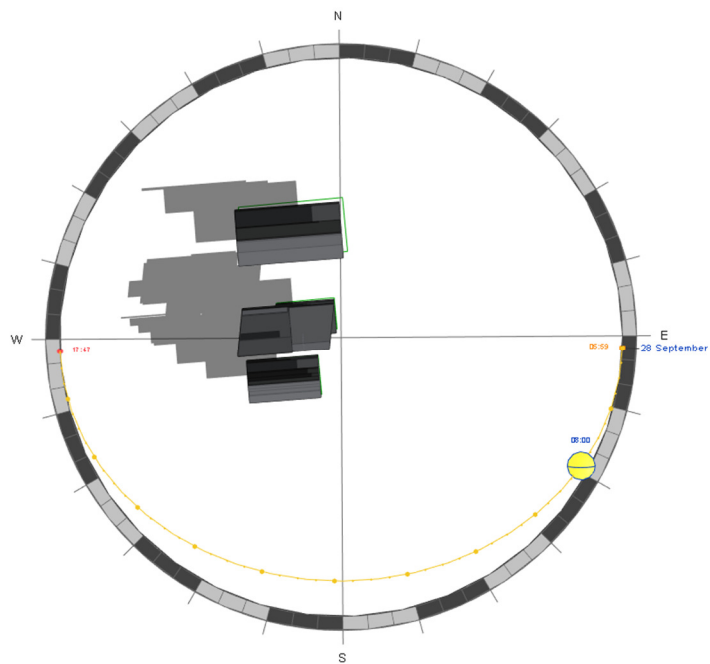


Figure 22 28 of September 8AM, proposed model

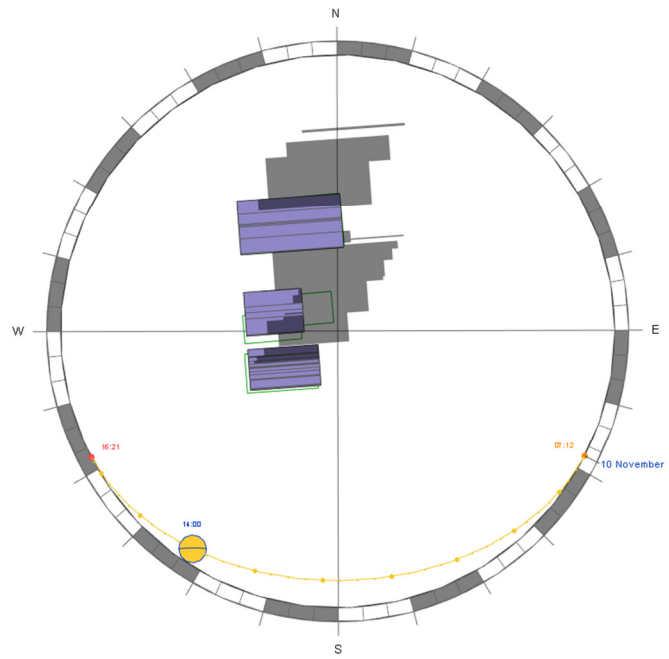


Figure 23 10 of November 2PM, existing model

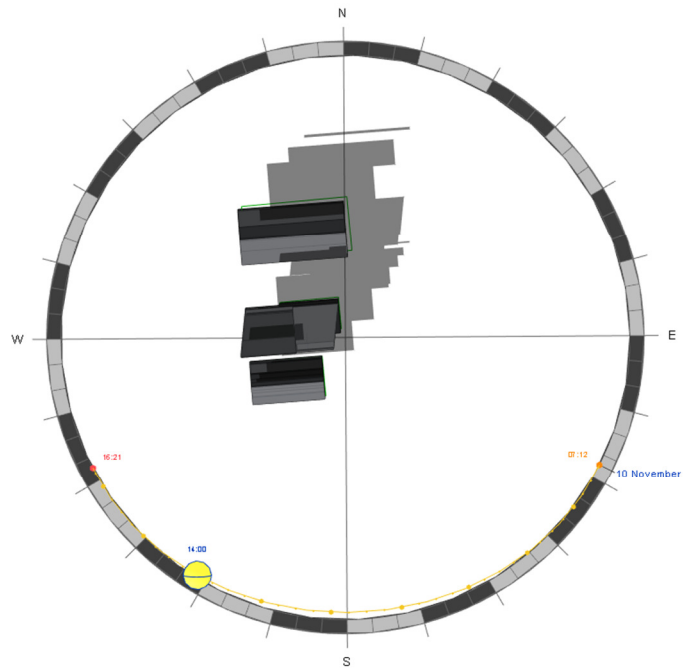


Figure 24 10 of November 2PM, proposed model

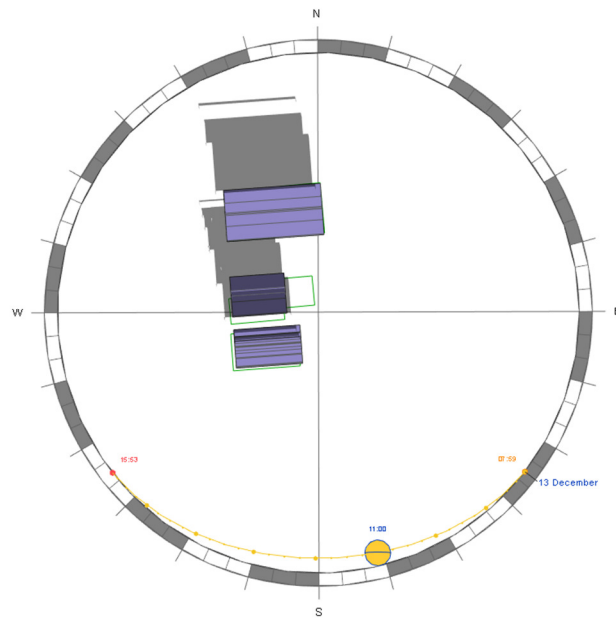


Figure 25 13 of December 11AM, existing model

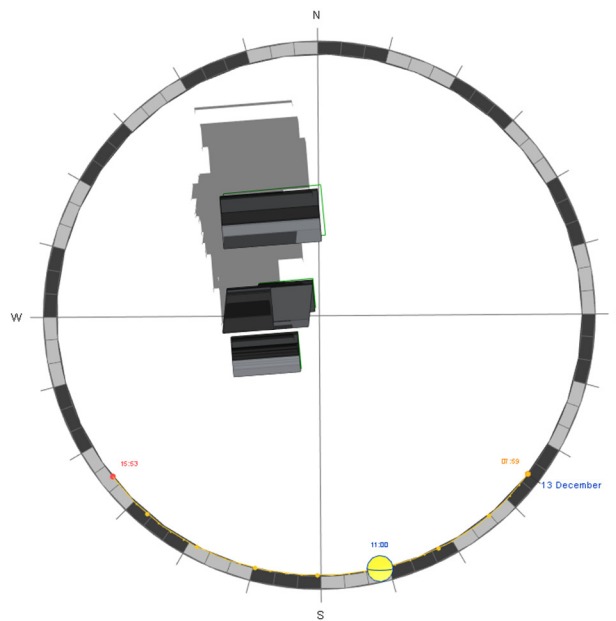


Figure 26 13 of December 11 AM, proposed model

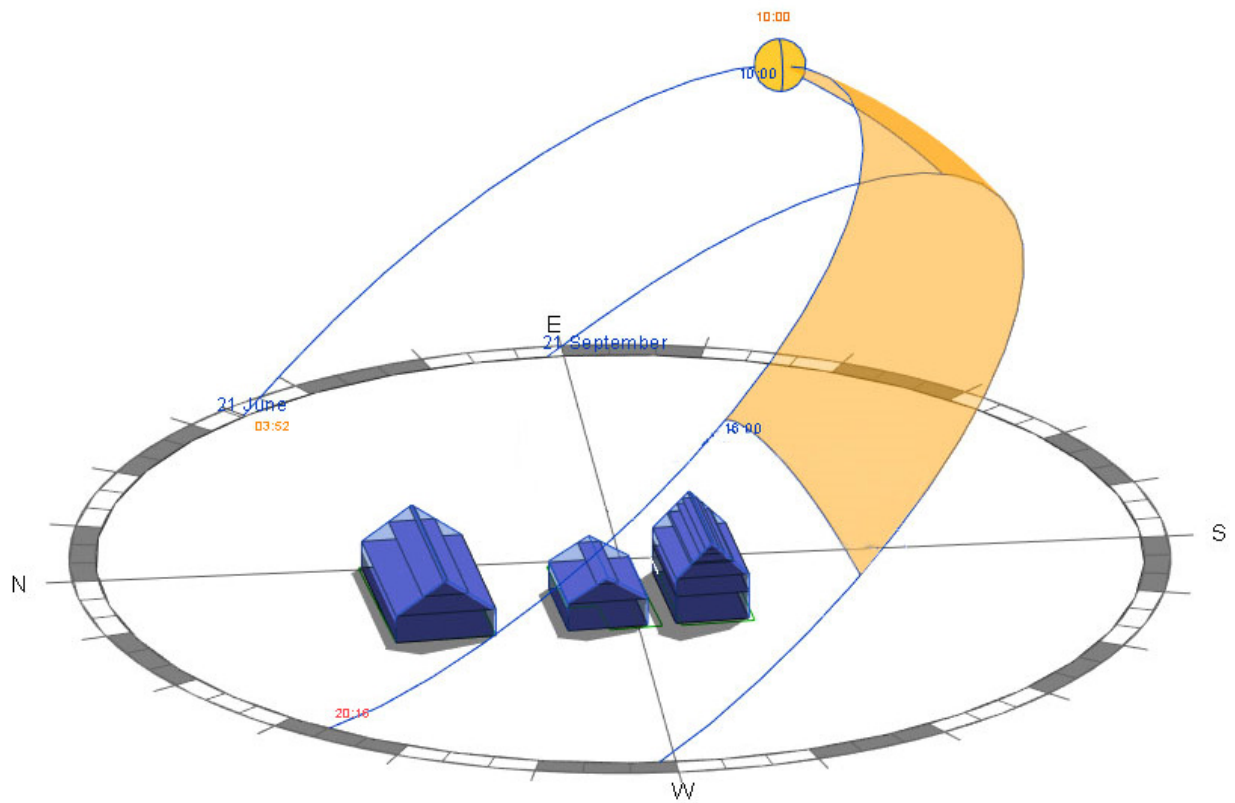


Figure 27 Existing multi-solar study summer

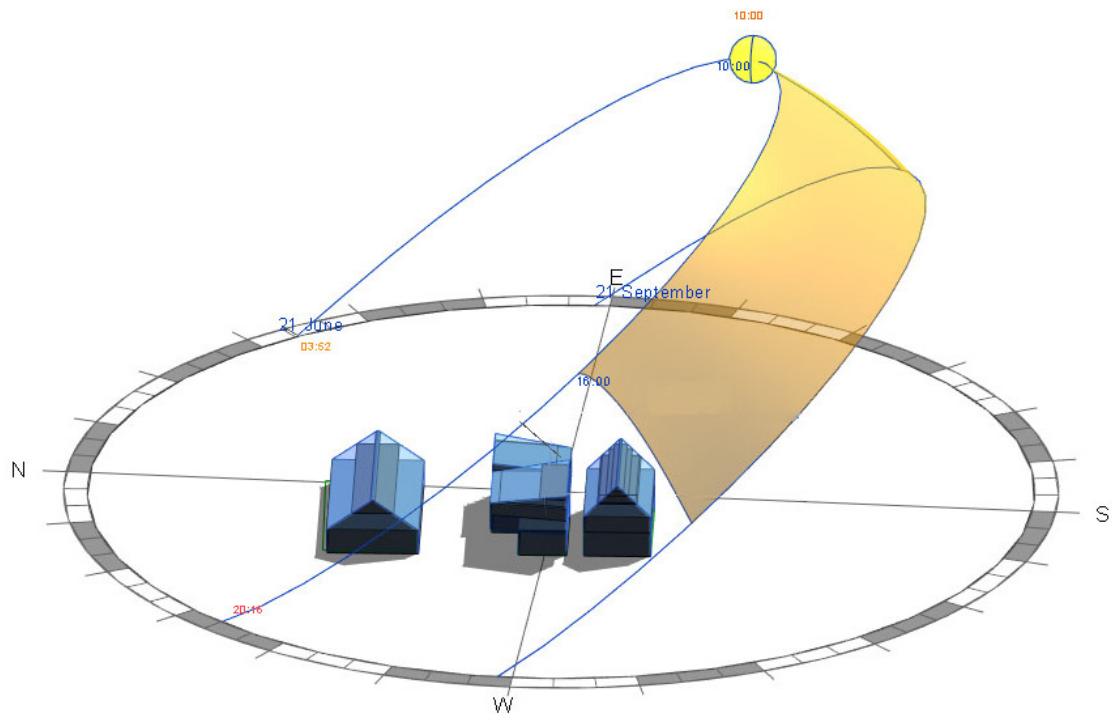


Figure 28 Proposed multi-solar study summer

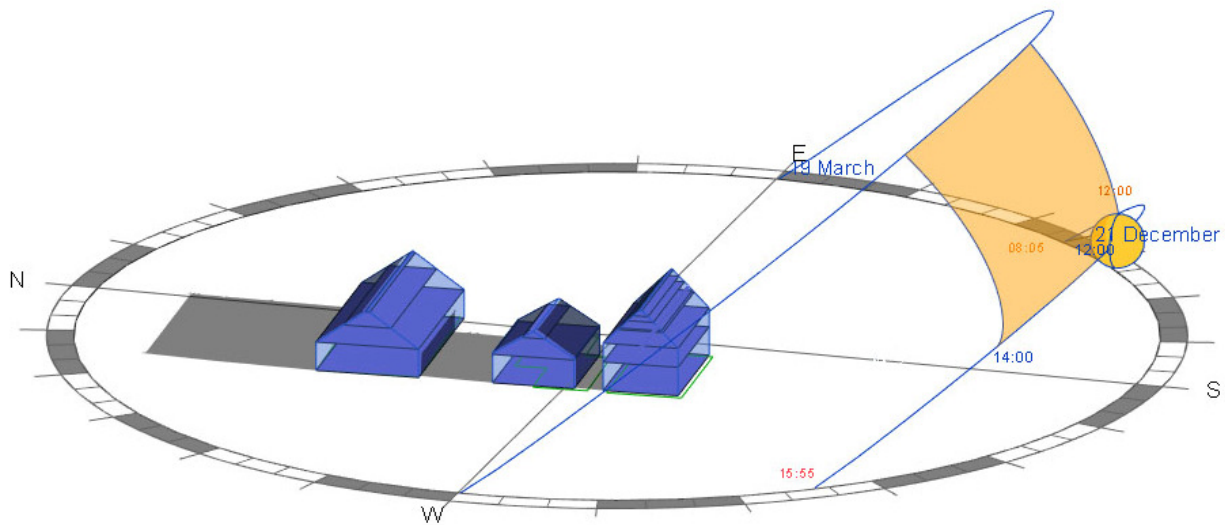


Figure 29 Existing multi-solar study winter

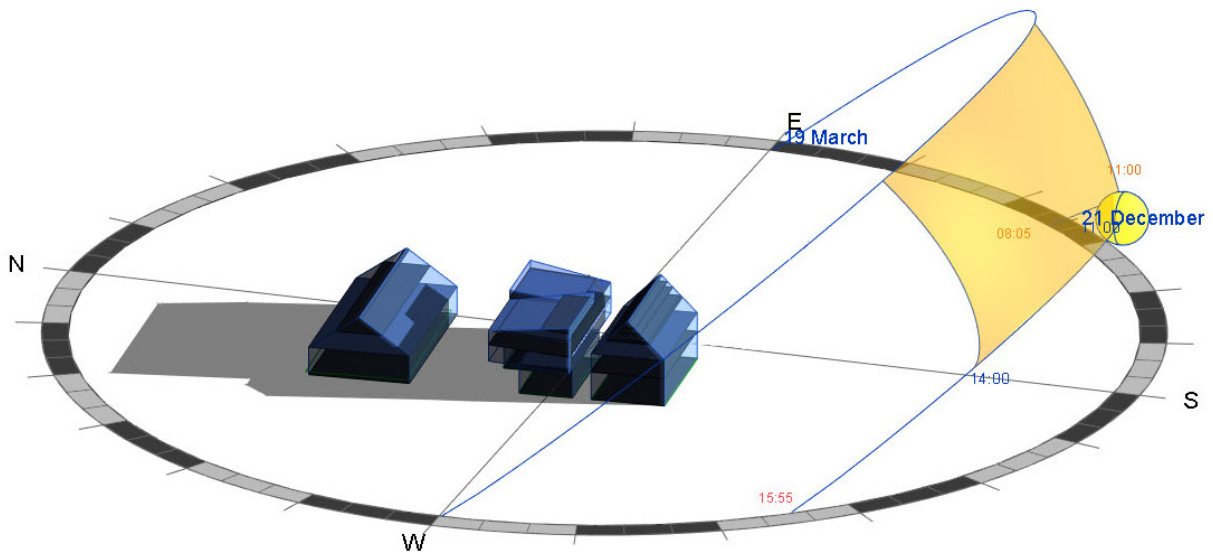


Figure 30 Proposed multi-solar study winter

The solar study highlights that even though 'The Nook' will be in shadow during winter time, the proposed building would make fractional difference due to neighbouring property already suffering from shadow on the South façade due to the position of the existing 'Bramleys' property which is the existing building to the South (Figure 29 & Figure 30).

9. Conclusion

Daylight

The results clearly demonstrate that 'The Nook' would still have the recommended 27% of VSC should permission be granted.

Sunlight

The provided models have been used to produce evidence with regards to the available sunlight. This uses similar methods as the Waldram diagram, and as the figures demonstrates, there are no major differences between existing and proposed, meaning neighbouring properties will NOT receive significantly less sunlight than existing.