SYNTEGRA CONSULTING

Daylight, Sunlight & Overshadowing Report

42 Caversham Road, London, NW5 2DS

January 2015

Ref: 14-1172

1. EXECUTIVE SUMMARY 6

2. INTRODUCTION 6

3. PLANNING POLICY 7

4. GUIDANCE DOCUMENT 7

4.1. Building Research Establishment (BRE) report (BRE 209): "Site layout planning for daylight and sunlight: A guide to good practice" Second Edition (2011) 7

5. ASSESSMENT METHODOLOGY 8

5.1. General 8

5.2. BRE Digest 209: "Site layout planning for daylight and sunlight" 9

5.2.1. Daylight 9

5.2.2. Sunlight 10

5.2.3. Overshadowing to gardens and open spaces 10

6. BRE DIGEST 209: SIGNIFICANT CRITERIA 11

6.1. Daylight 11

6.2. Sunlight 11

6.3. Overshadowing to gardens and open spaces 11

6.4. Criteria for assessing daylight, sunlight and overshadowing effects 12

Table 1: Criteria for assessing daylight, sunlight and overshadowing effects 12

7. ASSESSMENT 13

7.1. BS 8206-2: 1992 13

7.2. Daylight 13

Table 2: Daylight results 13

7.3. Sunlight 16

Table 3: Sunlight results 16

7.4. Overshadowing 17

Table 4: Overshadowing results 17

Table 5: Overshadowing results 18

8. CONCLUSION 19

8.1. Daylight 19

8.2. Sunlight 19
8.3. Overshadowing 19

9. APPENDIX 20
9.1. Sunrise and sunset time 20
9.2. Sun path 20
9.3. Suntrace 21
9.4. Site plan and location 22
9.4.1. Existing site layout 22
9.4.2. Proposed site layout 22
9.5. Model images 23
9.6. Daylight results 25
9.7. Sunlight results 27
9.8. Overshadowing results and pictures (21st March) 28

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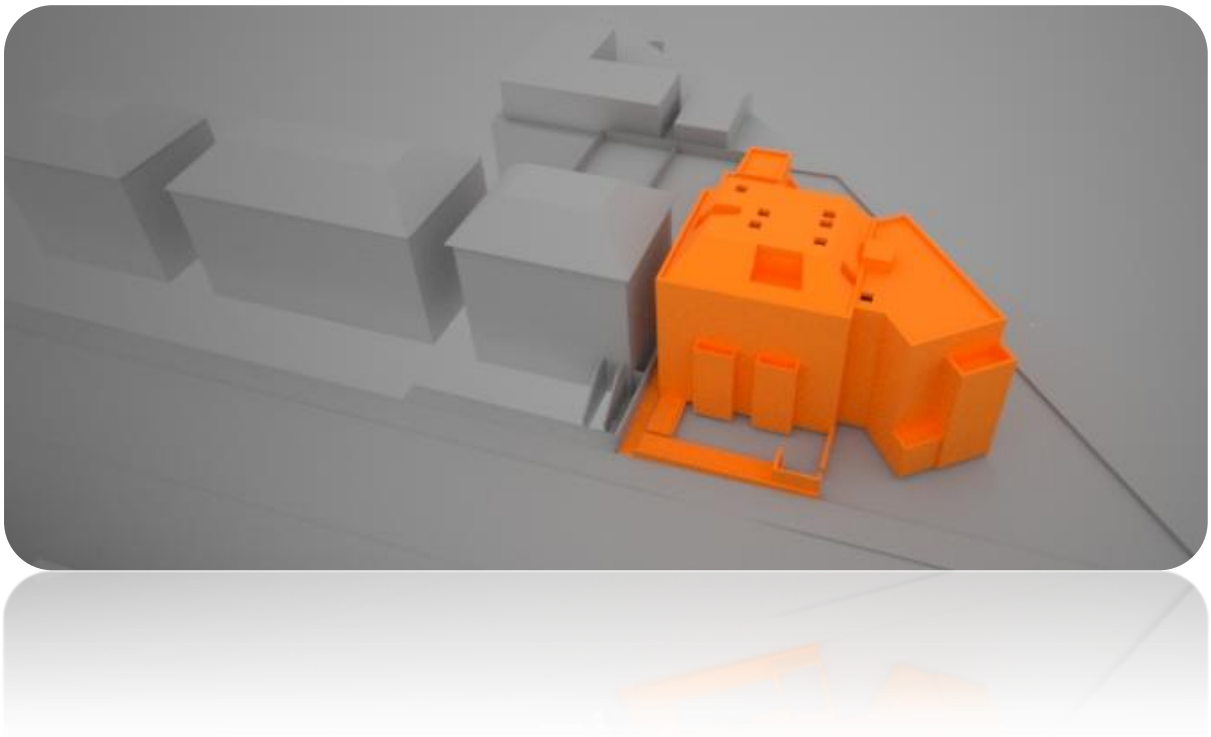

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1. Executive summary

This report demonstrates the impact of the proposed development **on the surrounding building and amenity areas/gardens/open spaces**.

The results of the assessment show that in terms of:

- Daylight, **the kitchen window at 40A Caversham Road** will not be adversely impacted by the proposed development. This is using a mirror-image of the existing building at 38-40 Caversham Road to set the existing VSC target.

The BRE criteria are met: ☑

- Sunlight, **the kitchen window at 40A Caversham Road** will not be adversely impacted by the proposed development

The BRE criteria are met: ☑

- Overshadowing, **the existing Amenity A1** achieve the BRE criteria on 21st March. **The Amenity A2** does not meet the BRE criteria on 21st March. However, the impact only occurs in the morning and does not affect the garden in the afternoon. It should also be noted that the proposed scheme does not impact the amenity A2 on 21st June (summer month).

In summary, the development proposals have been appraised in line with the guidelines set out in the BRE document. When assessed against the criteria for establishing whether the proposed development will have a significant impact, it has been possible to conclude that the development will not results in an unreasonable reduction in the amount of either daylight or sunlight enjoyed by the property at 38-40 Caversham Road.

2. Introduction

This report has been prepared to support the planning application for the proposed development at 42 Caversham Road, London NW5 2DS. The scheme involves the demolition of the existing building and the construction of a new 5 storey building. The report assesses the daylight, sunlight and overshadowing effect of the proposed development on the surrounding buildings and specifically focuses on the window of the residential building at 38-40 Caversham Road. The assessment is undertaken in accordance with ***"BRE 209 Digest: Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice".***

The existing & proposed drawings (in AutoCAD format) of the project were provided by **Norton Mayfield Architects** on the **08th January 2015** and have been used in preparing this report.

The study has been undertaken by constructing a 3D IES model of the existing and proposed site and surrounding buildings in order to analyse the daylight, sunlight and overshadowing impact of the new development on the affected buildings. All images used in this report are technical 3D models created using 2D AutoCAD Drawings (floor plans, sections and elevations) and not 3D visualisation images.

3. Planning policy

Where the proposed development has the potential to negatively impact the existing levels of daylight or sunlight on neighbouring properties, a daylight and sunlight assessment has to accompany the planning application.

The daylight and sunlight assessment includes the necessary information to meet the criteria outlined in the Site layout planning for daylight and sunlight: a guide to good practice published by the Building Research Establishment (BRE).

4. Guidance document

4.1. Building Research Establishment (BRE) report (BRE 209): "Site layout planning for daylight and sunlight: A guide to good practice" Second Edition (2011)

The Second Edition of the report replaces the 1991 document of the same name and came into effect from October 2011.

It is important to note that the introduction to the report stresses that the document is provided for guidance purposes only and it is not intended to be interpreted as a strict and rigid set of rules. It also recommends that it may be appropriate to adopt a flexible approach and alternative target values in dealing with *"special circumstances"* 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".* This is amplified by the following extracts from the introduction (p1, para. 6) and Section 2.2:

"The advice given here is not mandatory and this document 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 because natural lighting is only one of many factors in site layout design". (p1, para. 1.6)

"In special circumstances the Developer or Planning Authority may wish to use different target values". (p1, para. 1.6)

"Note that numerical values given here are purely advisory. Different criteria may be used, based upon the requirements for daylight in an area viewed against other site layout constraints. Another important issue is whether the existing building is itself a good neighbour, standing a reasonable distance from the boundary and taking no more than its fair share of light". (p7 para. 2.2.3)

The examples given in the report can be applied to any part of the country: suburban, urban and rural areas. The inflexible application of the target values given in the report may make reaching the BRE criteria difficult in a tight, urban environment where there is unlikely to be the same expectation of daylight and sunlight amenity as in a suburban or rural environment.

5. Assessment methodology

5.1. General

When assessing any potential effects on the surrounding properties, the BRE guidelines suggest that only those windows that have a reasonable expectation of daylight or sunlight need be assessed. In particular the BRE guidelines at paragraph 2.2.2 state:

"The guidelines given here are intended for use for rooms in adjoining dwellings where daylight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed. The guidelines may also be applied to any existing non-domestic buildings where the occupants have a reasonable expectation of daylight; this would normally include schools, hospitals, hotels and hostels, small workshops and some offices."

Further to the above statement, it is considered that the vast majority of commercial properties do not have a reasonable expectation of daylight or sunlight. This is because they are generally designed to rely on electric lighting rather than natural daylight or sunlight.

This report assesses the potential impact of the proposed development in relation to daylight, sunlight and overshadowing on the building at 40 Caversham Road. Specifically, it takes into consideration the possible effect and influence that the new development would have on the properties.

One target surfaces (S1) for external levels of daylight VSCs (Vertical Sky Components) and sunlight availability, as shown in section 9.4 in Appendix, have been selected based on anticipated worse case impact judged from professional experience and also following guidance within the BRE guidelines *"Site layout planning for daylight and sunlight".*

Two existing amenity areas/gardens/open spaces have been identified on the drawings and/or site plan at the rear of 38-40 Caversham Road.

The IES Virtual Environment modelling software utilised for the compilation of this report has been accredited by CIBSE and acknowledged by the BRE as a suitable software tool for undertaking daylight, sunlight and overshadowing assessments in accordance with the BRE Good Practice guidelines. The specific IES software modules utilised for this assessment are the following:

- ☐ ModelIT: enables you to create a 3D "Virtual Environment" model without CAD data, or alternatively allows you to create a 3D model from 2D CAD data. Interfaces with AutoCAD and Google Sketchup.

- ☐ Radiance: is a detailed 3D simulation tool designed to predict daylight and electric light levels, and the appearance of a space prior to construction. Vertical Sky Components (VSC) and Average Daylight Factors (ADF) can be simulated using Radiance.

- ☐ SunCast: produces visual, graphical and numerical information that can be used to explain to colleagues, clients and planning authorities how the sun impacts on and inside the building, and on the site.

If a property is considered to have a reasonable expectation of daylight or sunlight the following methodology to assess the impacts has been used.

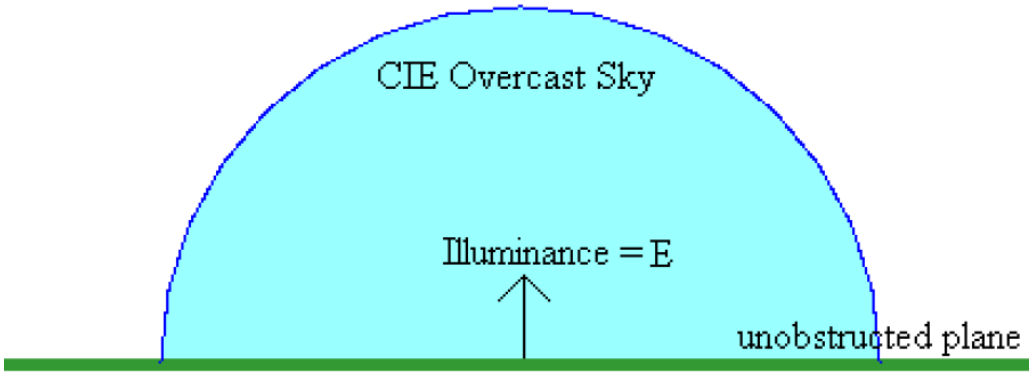
5.2. BRE Digest 209: "Site layout planning for daylight and sunlight"

This section provides a brief description of the calculating methods for the daylight, sunlight and overshadowing to gardens and open spaces criteria presented in BRE Digest 209.

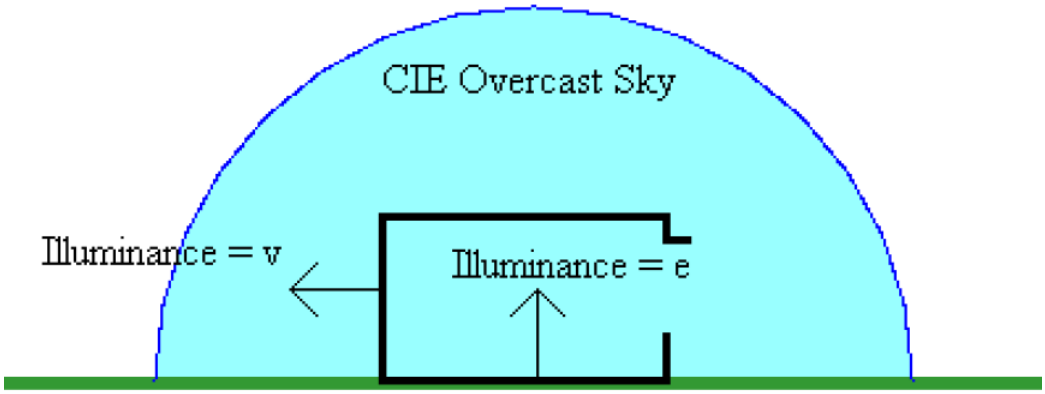
5.2.1. Daylight

The BRE guidelines *"Site layout planning for daylight and sunlight"* incorporate two main methods of calculating daylight: the Vertical Sky Component (VSC) method and the Average Daylight Factor (ADF) method.

The VSC method measures the amount of light available on the outside plane at the centre of a window, as a ratio (expressed as a percentage) of the amount of total unobstructed sky visible following the introduction of visible barriers such as buildings.



E = Illuminance on unobstructed plane



e = Illuminance at point in interior

Sky component = e/E (often expressed as a percentage %)

Vertical Sky Component (VSC) = v/E %

In this assessment, VSC is selected and more details on the numerical criteria for the VSC method are presented in section 9.6.

5.2.2. Sunlight

The BRE guidelines "*Site layout planning for daylight and sunlight*" recommend that access to sunlight is assessed with a development proposal. Potential impacts on available sunlight were assessed using the BRE's Annual Probable Sunlight Hours (APSH) method. This method involves the forecasting of sunlight availability throughout the year and in the winter months, for the main window of each habitable room that faces within 90° of due south. The buildings surrounding the site that do not contain windows that face within 90° of due south has been excluded from the sunlight assessment.

To provide a concise and comprehensive indicative analysis, the closest surfaces within the surrounding properties were analysed for both daylight and sunlight. Their locations are shown in section 9.4.1 in Appendix.

More details on the numerical criteria for the APSH method are presented in section 9.7.

5.2.3. Overshadowing to gardens and open spaces

The BRE guidelines *"Site layout planning for daylight and sunlight"* provide sunlight availability criteria for open spaces. In particular it gives guidance for calculating any areas of open space that may be in permanent shadow on 21st March.

In summary the BRE document states:

"It is suggested that, for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21st March. If as a result of new development, an existing garden or amenity area does not meet these guidelines, and the area which can receive two hours of sun on 21st March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable".

For this assessment the IES "Virtual Environment" SunCast software package has been used. A 3D model of the proposed and surrounding buildings was first modelled and the sunlight-tracking feature within the software used to view the shadow results. The study illustrated the extent of the shadow on one key date:

- March 21 (Spring Equinox)

More details on the numerical criteria for the overshadowing method are presented in section 9.8.

6. BRE Digest 209: Significant criteria

6.1. Daylight

The daylight criteria given within the BRE guidelines have been used as a basis to assess the potential impacts of the development:

"The daylighting is not considered to be substantially affected when the Vertical Sky Component (VSC) measured at the centre of a window is >27%. A window may be adversely affected if the VSC measured at the centre of the window is less than 27% and less than 0.8 times its former value".

In the assessment, the reduction between existing and proposed situations is expressed as a percentage, where a change in daylight levels above 20% equates to a figure of less than 0.8 times its former value.

Assessment points that do not meet the above criteria require further considerations to show the level of impact likely to be incurred.

6.2. Sunlight

The sunlight criteria given within the BRE guidelines have been used as a basis to assess the potential impacts of the development:

"A window may be adversely affected if a point at the centre of the window receives in the year less than 25% of the Annual Probable Sunlight Hours (APSH) including at least 5% of the APSH during the winter months (21st October to 21st March)".

Assessment points that do not meet the above criteria require further considerations to show the level of impact likely to be incurred.

6.3. Overshadowing to gardens and open spaces

The sunlight criteria given within the BRE guidelines have been used as a basis to assess the potential impacts of the development:

"It is suggested that, for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21st March. If as a result of new development, an existing garden or amenity area does not meet these guidelines, and the area which can receive two hours of sun on 21st March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable".

Assessment points that do not meet the above criteria require further considerations to show the level of impact likely to be incurred.

6.4. Criteria for assessing daylight, sunlight and overshadowing effects

The table 1 is a summary of the criteria to assess daylight, sunlight and overshadowing impacts:

Magnitude of effect	Criteria		
Beneficial	An improvement ratio > 1.3 of the baseline value		
Negligible	Daylight A VSC of 27% or above in the proposed scenario with adequate daylight distribution Or A reduction ratio <1.0 and ≥ 0.8 of the baseline value	Sunlight An APSH of 25%, of which 5% are in the winter months Or A reduction ratio <1.0 and ≥ 0.8 of the baseline value	Overshadowing 50% of any amenity areas receiving at least 2 hours of direct sunlight on 21st March Or A reduction ratio <1.0 and ≥ 0.8 of the baseline value
Minor adverse	A reduction ratio <0.8 and ≥ 0.7 of the baseline value		
Moderate adverse	A reduction ratio <0.7 and ≥ 0.6 of the baseline value		
Major adverse	A reduction ratio <0.6 of the baseline value		

Table 1: Criteria for assessing daylight, sunlight and overshadowing effects

Please note that in terms of daylight and sunlight BRE considers that a reduction in daylight or sunlight of less than 20% is not likely to be materially noticeable to occupiers of buildings. Our report then uses 10% increments of exceedance above the relevant threshold to be able to make the difference between minor, moderate and major adverse impact.

7. Assessment

7.1. BS 8206-2: 1992

The foreword to BS 8206-2: 1992 states that:

"The aim of the standard is to give guidance to architects, builders and others who carry out lighting design. It is recognised that lighting is only one of many matters that influence fenestration. These include other aspects of environmental performance (such as noise, thermal equilibrium and the control of energy use), fire hazards, constructional requirements, the external appearance and the surroundings of the site. The best design for a building does not necessarily incorporate the ideal solution for any individual function. For this reason, careful judgement should be exercised when using the criteria given in the standards for other purposes, particularly town planning control."

7.2. Daylight

The daylight results are presented in section 9.6 in Appendix. The images and results show and compare the external levels of daylight (VSC – Vertical Sky Components) on the surface at 40A Caversham Road with and without the proposed development.

A summary of results is displayed in the table 2 below:

Daylight assessment (Surrounding buildings)				
Building Target surface	**VSC (existing) >27%**	**VSC (proposed) >27%**	**Ratio**	**Result**
Surface 1 - 40A Caversham Road - Basement	12.86	5.19	0.40	Major adverse

Table 2: Daylight results

Note: For location of target surfaces, see Appendix section 9.4 "Site plan and location"

As can be seen in the above table, the window will be adversely impacted by the proposed development.

→ It should be noted that the existing VSC does not even meet the BRE criteria (> 27%). The existing level of daylight is already poor and therefore the smallest modification will adversely impact the daylight level.

The BRE states that "Sections 2.1 , 2.2 and 2.3 give numerical target values in assessing how much light from the sky is blocked by obstructing buildings. These values are purely advisory and different targets may be used based on the special requirements of the proposed development or its location."

"For example, in a mews in a historic city centre, a typical obstruction angle from ground floor window level might be close to 40°. This would correspond to a VSC of 18%, which could be used as a target value for development in that street if new development is to match the existing layout".

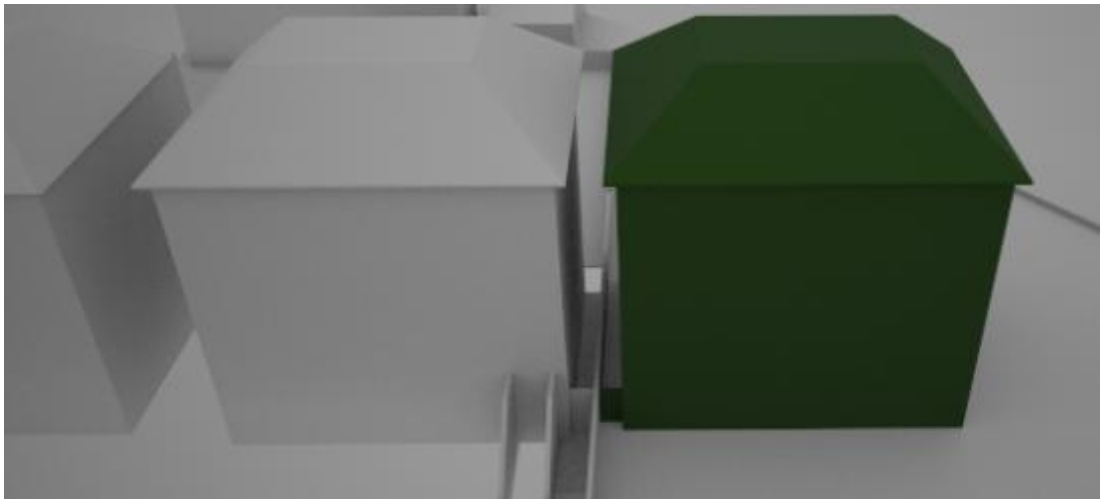
"A similar approach may be adopted in cases where an existing building has a windows that are unusually close to the boundary and taking more than their fair share of light [...] To ensure that the new development matches the height and proportions of existing buildings, the VSC and APSH targets for these windows could be set to those for a "mirror-image" building of the same height and size, an equal distance away on the other side of the boundary."

→ As per the above statement, the proposed scheme will follow the existing layout of the road and therefore in this case it is acceptable to create a mirror-image of the existing building at 38-40 Caversham Road in order to set the VSC and APSH targets.

Site plan

Daylight assessment (Surrounding buildings)				
Building Target surface	VSC (existing) >27%	VSC (proposed) >27%	Ratio	Result
Surface 1 - 40A Caversham Road - Basement "mirror-image"	4.66	5.19	1.11	Negligible

Creating a mirror-image of the building at 38-40 Caversham Road gives an existing VSC value of 4.66 for the kitchen window. As can be seen in the above table, the window will actually receive more daylight with the proposed scheme than with the mirror-image of 38-40 Caversham Road.



Mirror-image of 40 Caversham Road

→ **Following the above guidance it can be considered that the proposed scheme is acceptable in terms of daylight.**

It should be noted that the values provided in the BRE 209 are for guidance purposes only.

7.3. Sunlight

Where necessary (as defined in the Assessment Methodology section of this report) Annual Probable Sunlight Hours (APSH) tests have been undertaken with the results presented in section 9.7 in the appendix.

The table below indicates the likely levels of sunlight on the surface of 40A Caversham Road with and without the proposed development.

A summary of results is displayed in the table 3 below:

Sunlight assessment (Surrounding buildings)							
Building Target surface	Total APSH >25%		Winter APSH >5%		Ratio Annual	Ratio Winter	Result
	Existing	Proposed	Existing	Proposed			
Surface 1 - 40A Caversham Road - Basement	16	16	0	0	1.00	1.00	Negligible

Table 3: Sunlight results

Note: For location of target surfaces, see Appendix section 9.4 "Site plan and location"

The table above demonstrates that, the window will not be adversely impacted by the proposed development.

→ **The proposed scheme is acceptable in terms of sunlight.**

It should be noted that the values provided in the BRE 209 are for guidance purposes only.

7.4. Overshadowing

The following results represent the cumulative overshadowing impacts of the proposed development. As identified from the AutoCAD drawings and/or site plan, two existing amenity area are located at the rear of 38-40 Caversham Road. In accordance with the BRE guidelines, overshadowing has been assessed during times of the day where the sun's altitude is above 10º (from 7:30am to 5:00pm).

"It is suggested that, for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21st March. If as a result of new development, an existing garden or amenity area does not meet these guidelines, and the area which can receive two hours of sun on 21st March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable".

The pictures showing the overshadowing impact are indicated in section 9.8 of the Appendix.

A summary of results is displayed in the table 4 below:

Overshadowing assessment from 7.30am to 5.00pm % of area receiving sunlight on 21st March				
Amenity area	**Existing (%)**	**Proposed (%)**	**Ratio**	**Result**
Amenity 1 - 38 Caversham Road - Garden	26.06	21.72	0.83	Negligible
Amenity 2 - 40 Caversham Road - Garden	24.60	16.27	0.66	Moderate adverse

Table 4: Overshadowing results

Note: For location of target surfaces, see Appendix section 9.4 "Site plan and location"

As can be seen in the table above, one of the existing amenity areas/gardens/open spaces will be adversely impacted by the proposed development.

Amenity A2:

- **Comparison between existing and proposed results:**

Month	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
Mar	#DIV/0!	0%	16%	47%	98%	100%	100%	100%	100%	100%

Legend:

- 100% means that the area will receive the same amount of direct sunlight with and without the proposed development.
- 0% means that there is a reduction of 100% of area receiving direct sunlight with the proposed development.
- #DIV/0! means that both existing and proposed value are equal to 0.00%

As it can be seen above, most of the impact will occur in the morning until 11.00am. The garden is not impact the whole afternoon.

Another simulation has been carried out on 21st June (summer months) to show the difference.

A summary of results is displayed in the table 5 below:

Overshadowing assessment from 7.30am to 5.00pm % of area receiving sunlight on 21st June				
Amenity area	**Existing (%)**	**Proposed (%)**	**Ratio**	**Result**
Amenity 2 - 40 Caversham Road - Garden	46.88	43.78	0.93	Negligible

Table 5: Overshadowing results

Note: For location of target surfaces, see Appendix section 9.4 "Site plan and location"

The existing amenity area/garden/open space (Amenity 2) surpasses the criteria and will therefore provide adequate level of sunlight during the summer months when people are more likely to use their garden.

- The Amenity A1 achieve the BRE criteria on 21st March
- The Amenity A2 does not meet the BRE criteria on 21st March. However, the impact only occurs in the morning and does not affect the garden in the afternoon. It should also be noted that the proposed scheme does not impact the amenity A2 on 21st June (summer month).

→ **On balance, it can be considered that the proposed scheme is acceptable in terms of overshadowing.**

It should be noted that the values provided in the BRE 209 are for guidance purposes only.

8. Conclusion

8.1. Daylight

This report demonstrates that the level of daylight for the kitchen at 40A Caversham Road is adequate. This is using a mirror-image of the existing building to set the existing VSC target.

BRE criteria met: ☑

8.2. Sunlight

This report demonstrates that the level of sunlight for the kitchen at 40A Caversham Road is adequate.

BRE criteria met: ☑

8.3. Overshadowing

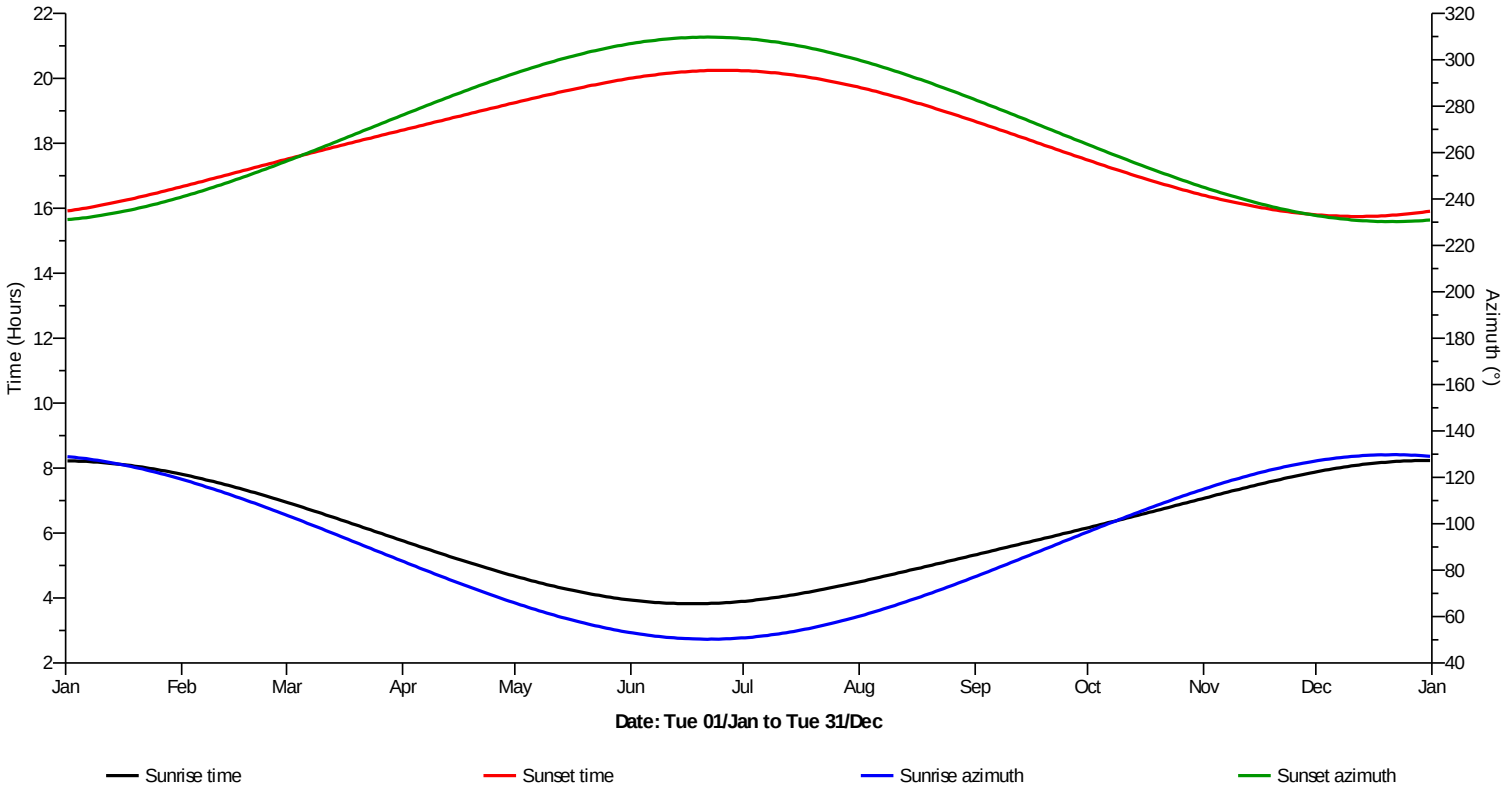
This report demonstrates that:

- The Amenity A1 achieve the BRE criteria on 21st March
- The Amenity A2 does not meet the BRE criteria on 21st March. However, the impact only occurs in the morning and does not affect the garden in the afternoon. It should also be noted that the proposed scheme does not impact the amenity A2 on 21st June (summer month).

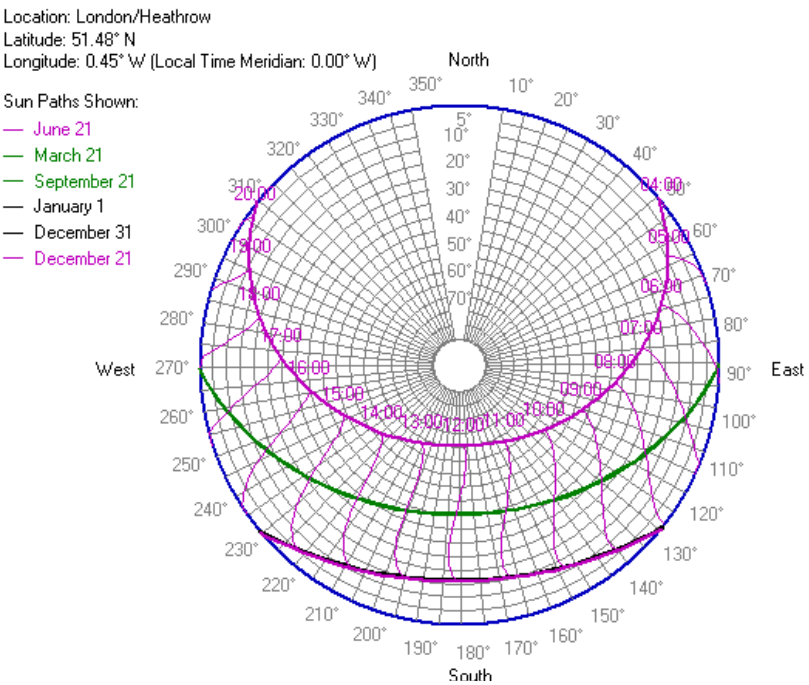
In summary, the development proposals have been appraised in line with the guidelines set out in the BRE document. When assessed against the criteria for establishing whether the proposed development will have a significant impact, it has been possible to conclude that the development will not results in an unreasonable reduction in the amount of either daylight or sunlight enjoyed by the property at 38-40 Caversham Road.

9. Appendix

9.1. Sunrise and sunset time

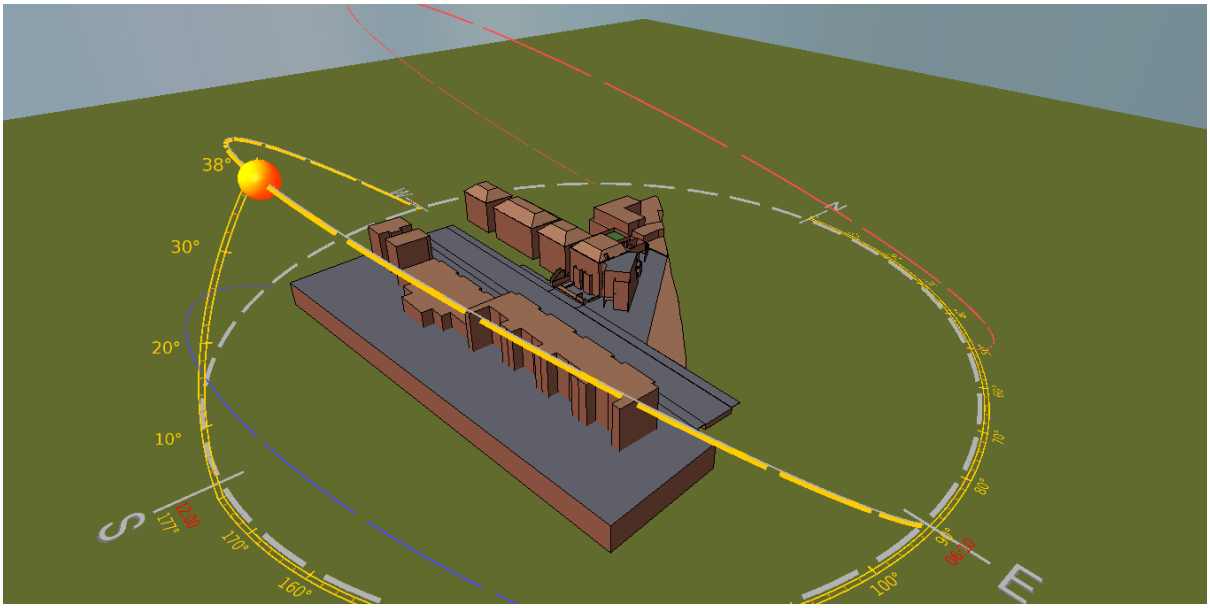


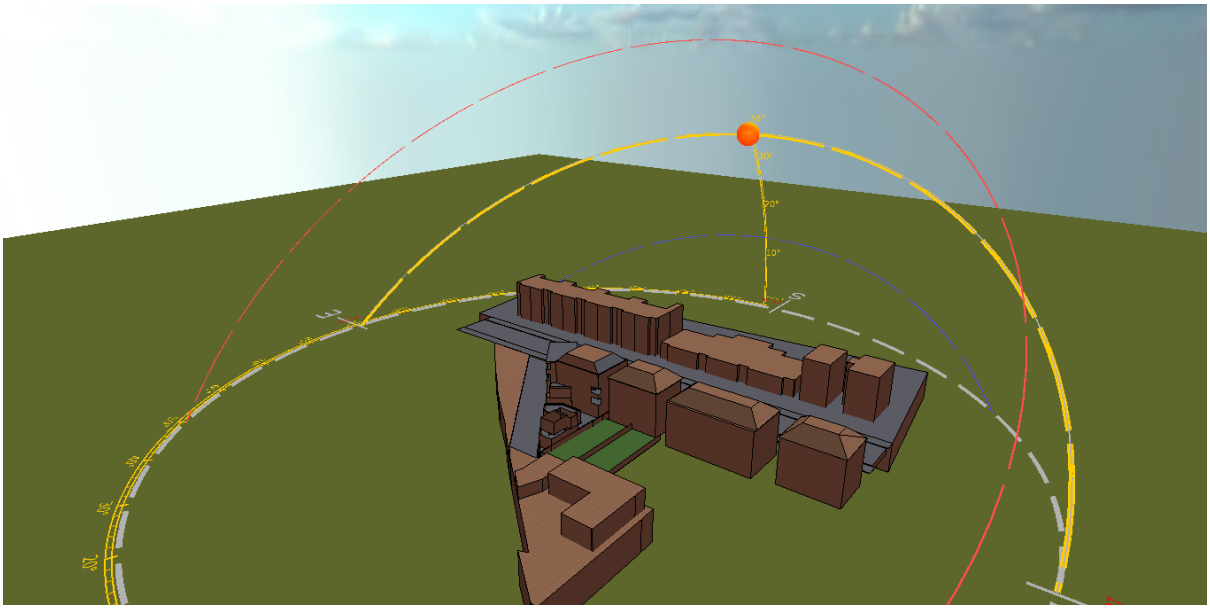
9.2. Sun path



9.3. Suntrace

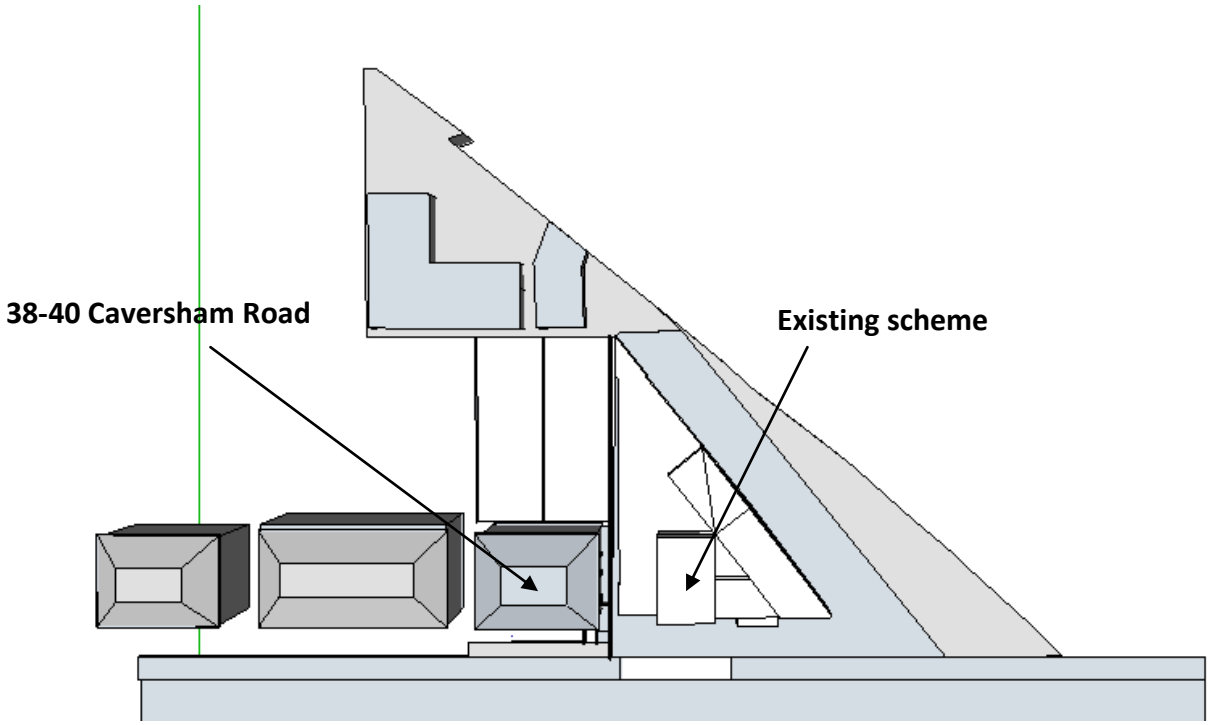
- The red line represents the sun's path during June.
- The yellow line represents the sun's path during March/September.
- The blue line represents the sun's path during December.



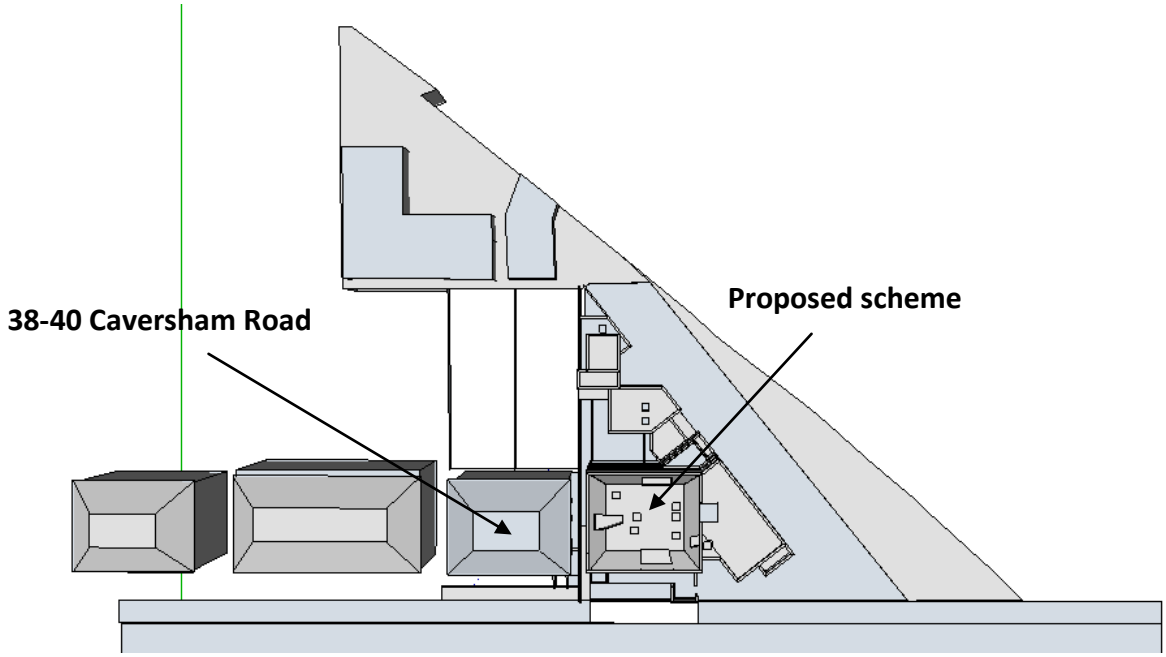


9.4. Site plan and location

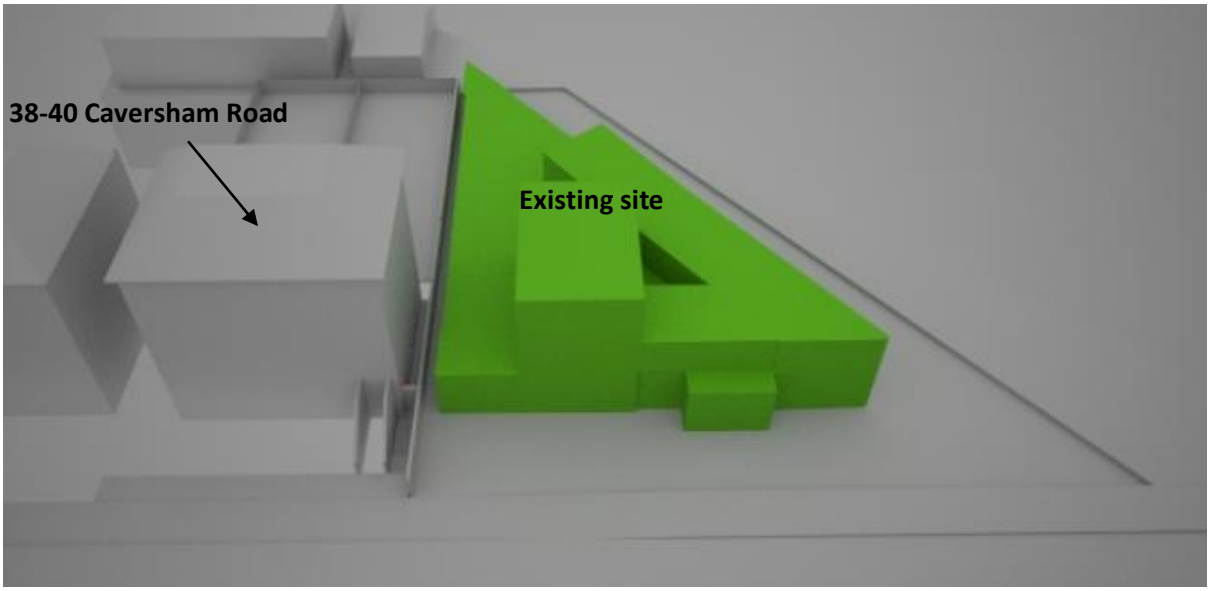
9.4.1. Existing site layout



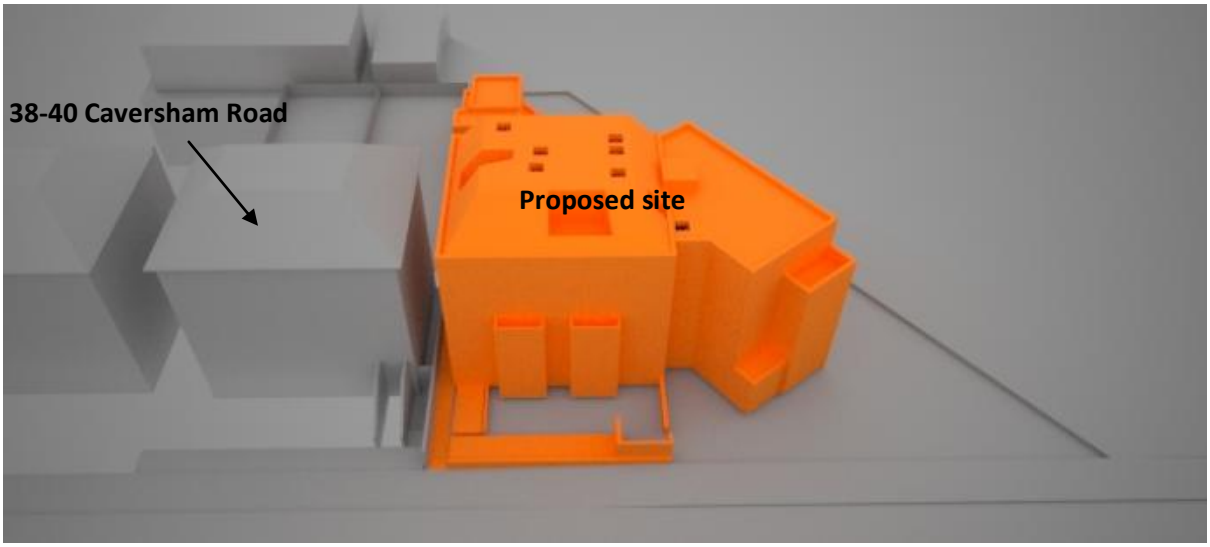
9.4.2. Proposed site layout



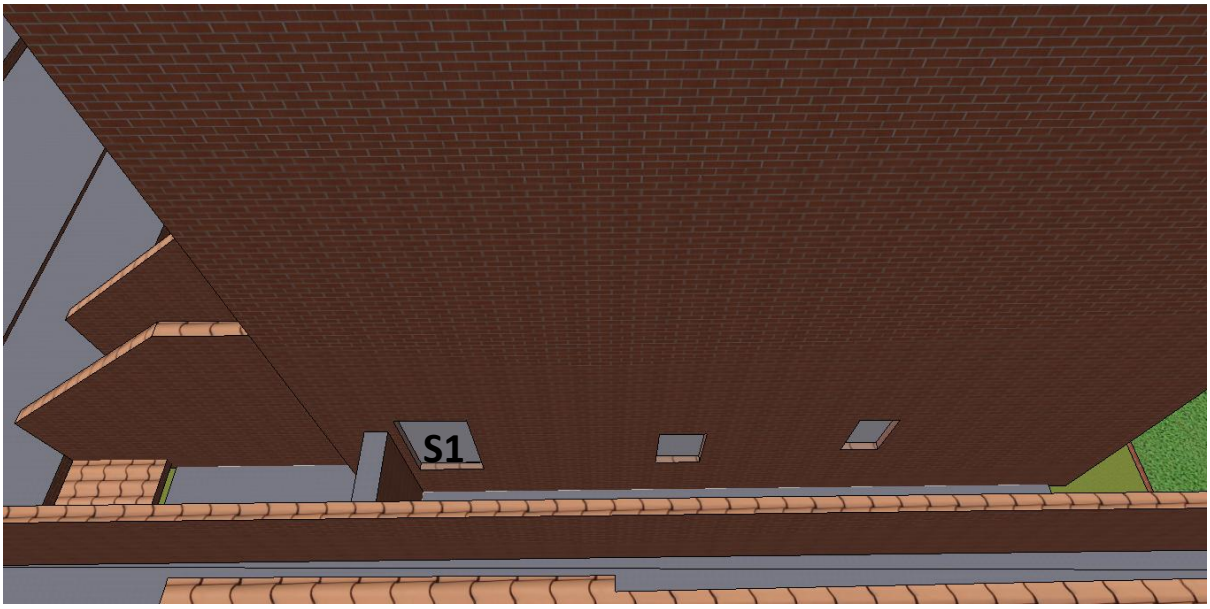
9.5. Model images



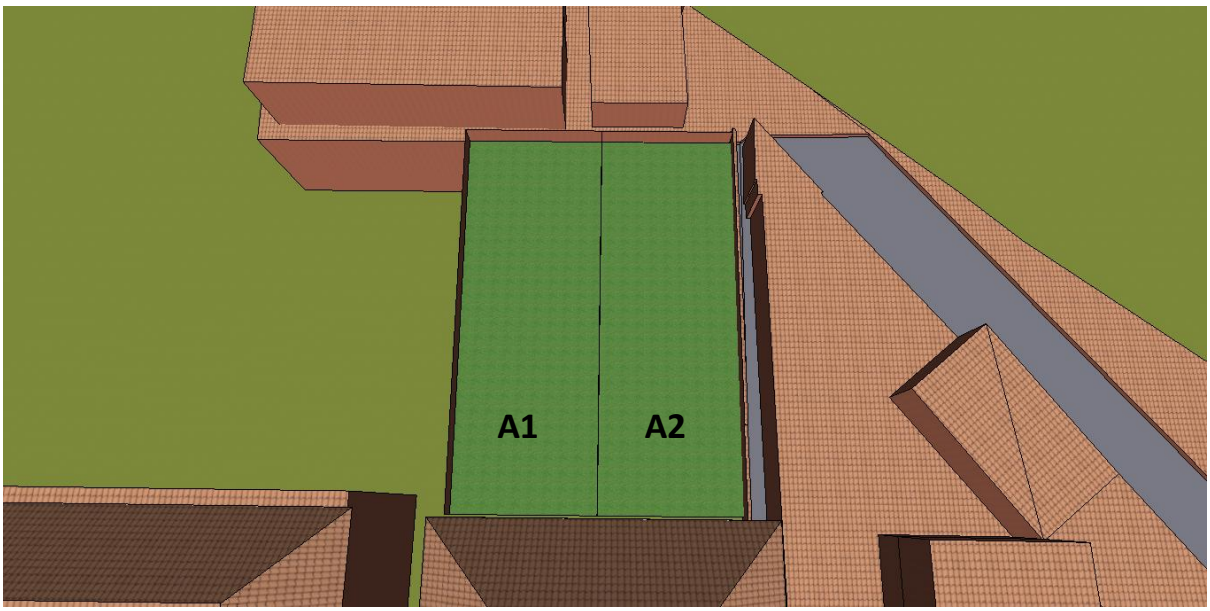
Existing scheme



Proposed scheme



40A Caversham Road

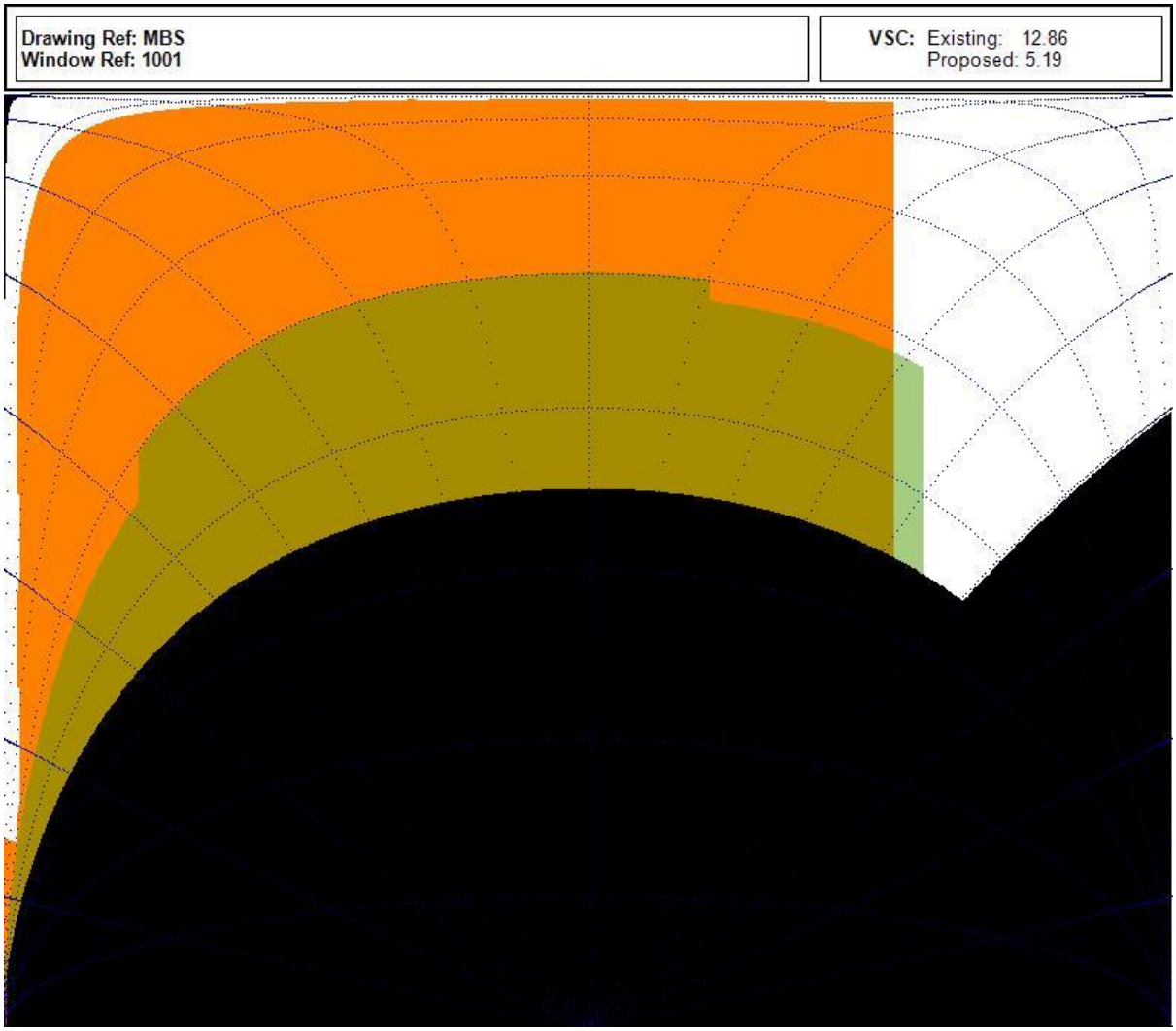


Amenity areas: 38-40 Caversham Road

Location	42 Caversham Road, London NW5 2DS
Latitude (°)	51.55 N
Longitude (°)	0.14 W

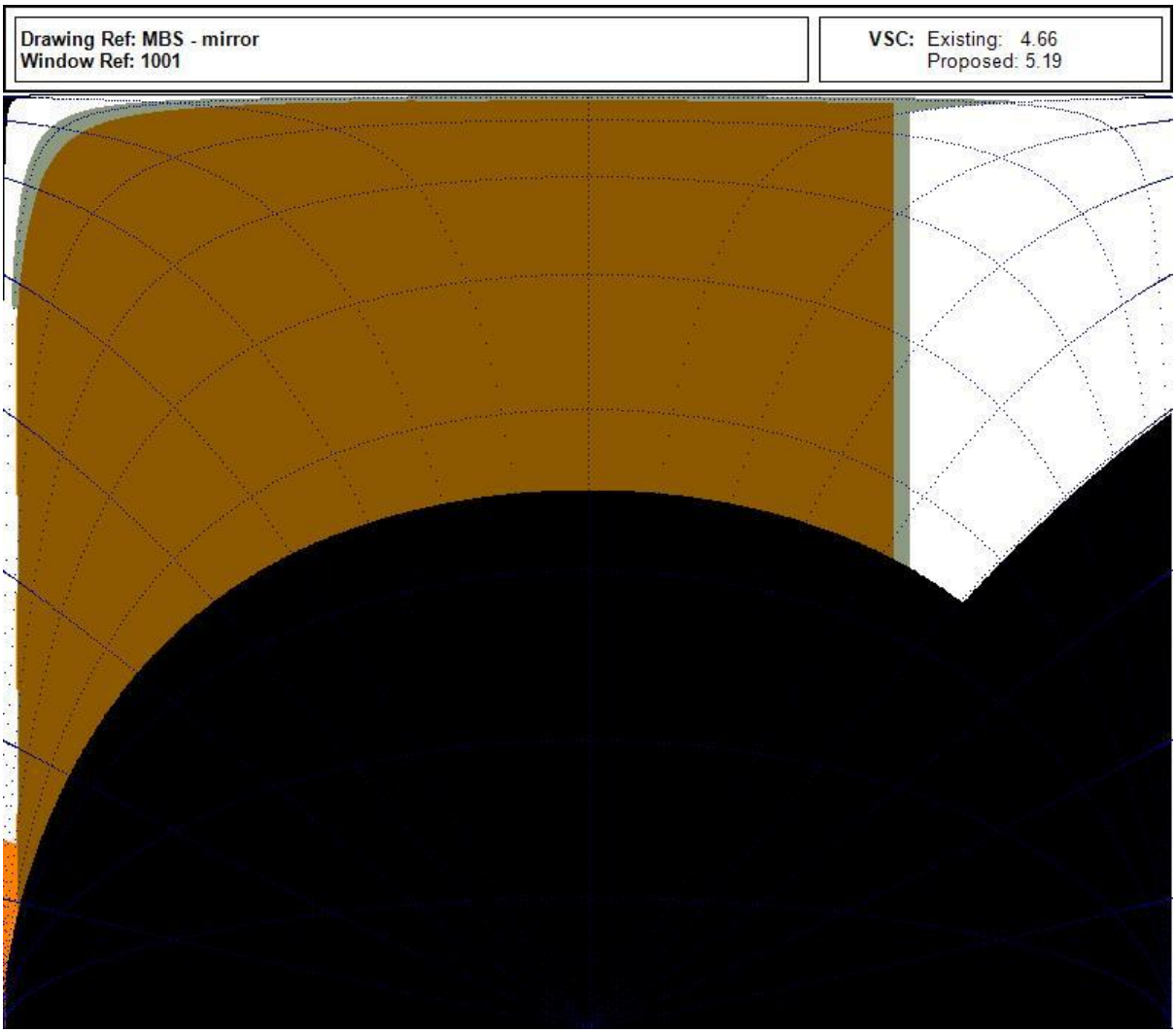
9.6. Daylight results

Surface 1 - 40A Caversham Road - Basement



The green contour represents the existing building.
The orange contour represents the proposed building.
The black contour represents the surrounding buildings.

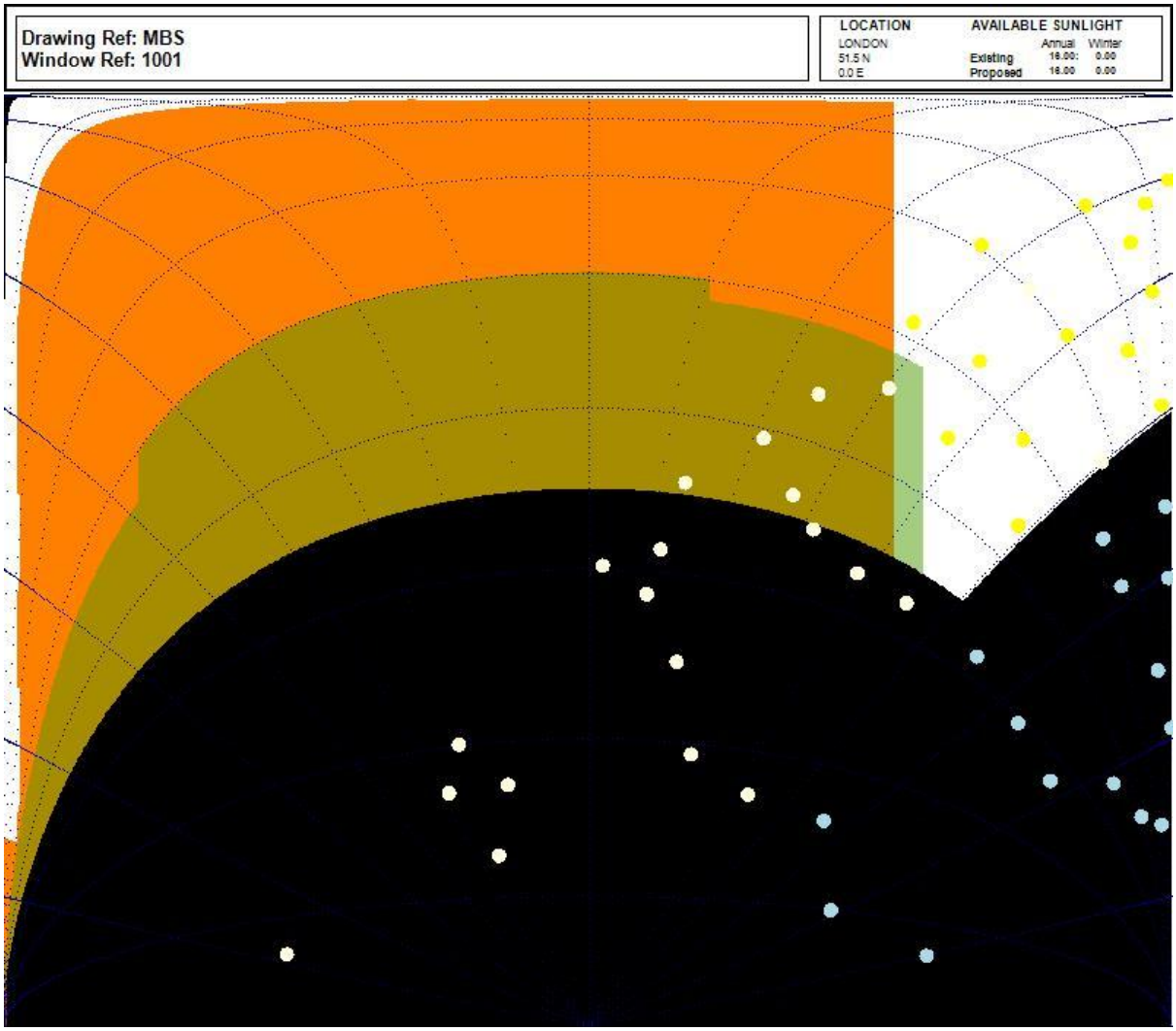
Surface 1 - 40A Caversham Road - Basement "mirror-image"



The green contour represents the existing building.
The orange contour represents the proposed building.
The black contour represents the surrounding buildings.

9.7. Sunlight results

Surface 1 - 40A Caversham Road - Basement



The green contour represents the existing building.
The orange contour represents the proposed building.
The black contour represents the surrounding buildings.

The yellow dot represents the available sunlight during the summer months (Summer).
The blue dot represent the available sunlight during the winter months (Winter).
The sum of the yellow and blue dots give the available sunlight for the whole year (Annual).

The white dot represents the sunlight blocked by buildings.

9.8. Overshadowing results and pictures (21st March)

Amenity 1 - 38 Caversham Road - Garden

The results are expressed as a percentage of area receiving direct sunlight on 21st March.

Existing

Month	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
Jan						0.00	2.00	0.00	9.00	19.30	0.00	0.00	0.00				
Feb					0.00	2.10	19.40	0.10	4.30	26.10	0.00	0.00	0.00	0.00			
Mar				**0.00**	**25.70**	**43.60**	**34.10**	**33.80**	**43.30**	**49.00**	**32.90**	**26.30**	**19.60**	**4.40**	**0.00**		
Apr		0.00	0.00	46.50	58.80	56.30	54.50	56.60	66.30	65.30	56.60	50.00	47.80	41.80	0.00		
May		0.00	40.60	64.10	69.20	66.40	66.20	67.90	75.70	74.60	68.40	62.40	62.60	60.50	34.10	0.00	
Jun	0.00	2.20	46.60	66.20	72.90	70.40	70.10	71.50	78.10	78.40	72.50	67.20	67.30	65.70	45.20	6.70	0.00
Jul		0.00	34.80	61.70	69.60	67.10	66.40	67.90	74.10	76.30	69.50	63.00	63.00	62.80	41.10	0.00	
Aug			0.00	45.90	58.70	56.80	54.60	56.70	65.40	66.30	57.50	50.40	48.30	43.00	1.30	0.00	
Sep			0.00	2.70	29.60	42.30	33.10	35.10	51.60	44.80	30.00	25.50	19.20	0.00			
Oct				0.00	1.30	15.20	6.40	0.00	29.80	8.20	0.00	0.00	0.00				
Nov					0.00	0.00	1.60	0.00	27.50	5.00	0.00	0.00					
Dec						0.00	1.20	0.00	22.30	13.80	0.00	0.00					

Proposed

Month	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
Jan						0.00	0.00	0.00	9.00	19.30	0.00	0.00	0.00				
Feb					0.00	0.00	0.00	0.10	4.30	26.10	0.00	0.00	0.00	0.00			
Mar				**0.00**	**3.20**	**17.00**	**31.20**	**33.80**	**43.30**	**49.00**	**32.90**	**26.30**	**19.60**	**4.40**	**0.00**		
Apr		0.00	0.00	25.30	46.80	51.10	54.50	56.60	66.30	65.30	56.60	50.00	47.80	41.80	0.00		
May		0.00	26.90	61.60	62.80	66.10	66.20	67.90	75.70	74.60	68.40	62.40	62.60	60.50	34.10	0.00	
Jun	0.00	1.70	32.00	66.20	68.40	70.40	70.10	71.50	78.10	78.40	72.50	67.20	67.30	65.70	45.20	6.70	0.00
Jul		0.00	22.80	59.00	63.00	66.10	66.40	67.90	74.10	76.30	69.50	63.00	63.00	62.80	41.10	0.00	
Aug			0.00	25.10	47.20	50.90	54.60	56.70	65.40	66.30	57.50	50.40	48.30	43.00	1.30	0.00	
Sep			0.00	1.20	9.40	18.60	33.10	35.10	51.60	44.80	30.00	25.50	19.20	0.00			
Oct				0.00	0.00	0.00	1.30	0.00	29.80	8.20	0.00	0.00	0.00				
Nov					0.00	0.00	0.00	0.00	27.50	5.00	0.00	0.00					
Dec						0.00	0.00	0.00	22.30	13.80	0.00	0.00					

Overshadowing assessment % of the amenity area receiving direct sunlight on 21st March		
Existing	Proposed	Ratio
26.06	21.72	0.83

Amenity 2 - 40 Caversham Road - Garden

The results are expressed as a percentage of area receiving direct sunlight on 21st March.

Existing

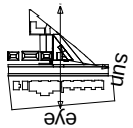
Month	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
Jan						0.00	1.30	31.30	16.30	0.00	0.00	0.00	0.00				
Feb					0.00	0.20	11.40	51.00	19.00	0.00	8.50	0.00	0.00	0.00			
Mar				**0.00**	**0.00**	**24.50**	**53.70**	**58.00**	**44.10**	**33.70**	**32.90**	**27.20**	**18.70**	**2.40**	**0.00**		
Apr		0.00	0.00	0.50	35.60	57.20	72.70	67.60	60.70	55.30	53.20	54.20	46.40	39.70	0.00		
May		0.00	1.00	33.20	55.40	71.00	77.20	74.50	70.40	66.30	64.70	65.80	63.20	59.50	32.30	0.00	
Jun	0.00	0.10	1.90	39.00	60.40	73.90	79.20	77.20	74.70	70.20	68.70	69.20	69.20	65.40	43.40	4.50	0.00
Jul		0.00	0.90	28.40	53.30	69.10	77.70	75.20	72.20	67.00	65.30	65.80	64.60	61.20	39.20	0.00	
Aug			0.00	0.00	34.60	56.20	72.90	68.10	61.80	55.80	53.50	54.80	47.00	41.00	0.00	0.00	
Sep			0.00	0.00	7.60	30.80	61.00	54.70	37.10	33.50	35.20	24.70	16.50	0.00			
Oct				0.00	0.00	3.30	36.90	35.00	0.10	0.60	0.30	0.00	0.00				
Nov					0.00	0.00	9.10	30.50	0.60	0.00	0.00	0.00					
Dec						0.00	0.00	26.90	11.00	0.00	0.00	0.00					

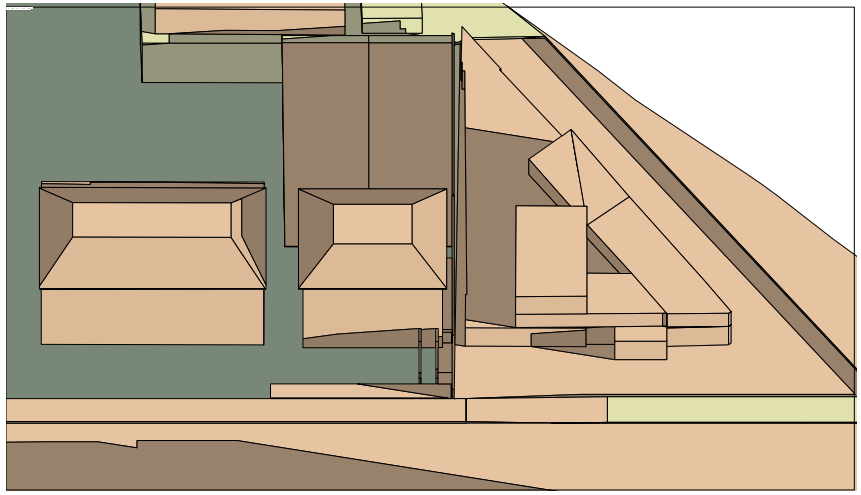
Proposed

Month	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
Jan						0.00	0.00	0.00	15.40	0.00	0.00	0.00	0.00				
Feb					0.00	0.00	0.00	2.60	17.20	0.00	8.50	0.00	0.00	0.00			
Mar				**0.00**	**0.70**	**0.10**	**8.80**	**27.50**	**43.30**	**33.70**	**32.90**	**27.20**	**18.70**	**2.40**	**0.00**		
Apr		0.00	0.20	14.90	16.70	25.30	37.60	52.60	60.70	55.30	53.20	54.20	46.40	39.70	0.00		
May		0.00	16.00	33.30	36.50	44.40	54.60	65.10	70.40	66.30	64.70	65.80	63.20	59.50	32.30	0.00	
Jun	0.00	0.60	20.30	38.30	43.30	49.60	58.80	68.20	74.60	70.20	68.70	69.20	69.20	65.40	43.40	4.50	0.00
Jul		0.00	12.00	33.30	36.00	43.80	53.50	63.80	71.80	67.00	65.30	65.80	64.60	61.20	39.20	0.00	
Aug			0.00	14.70	16.90	25.10	36.90	52.00	61.60	55.80	53.50	54.80	47.00	41.00	0.00	0.00	
Sep			0.00	0.20	0.30	0.80	11.60	33.10	37.10	33.50	35.20	24.70	16.50	0.00			
Oct				0.00	0.00	0.00	0.00	6.60	0.10	0.60	0.30	0.00	0.00				
Nov					0.00	0.00	0.00	1.90	0.60	0.00	0.00	0.00					
Dec						0.00	0.00	0.00	11.00	0.00	0.00	0.00					

Overshadowing assessment % of the amenity area receiving direct sunlight on 21st March		
Existing	Proposed	Ratio
24.60	16.27	0.66

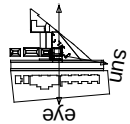
Suncast image:
View time = 21 Mar 07:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 100.42 alt = 7.66
Eye: azi = 180.00 alt = 60.00

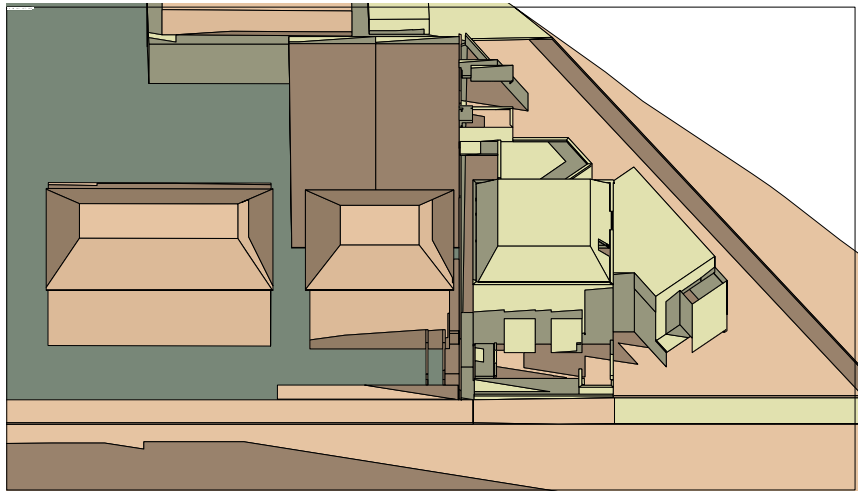




Existing

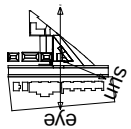
Suncast image:
View time = 21 Mar 07:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 100.42 alt = 7.66
Eye: azi = 180.00 alt = 60.00

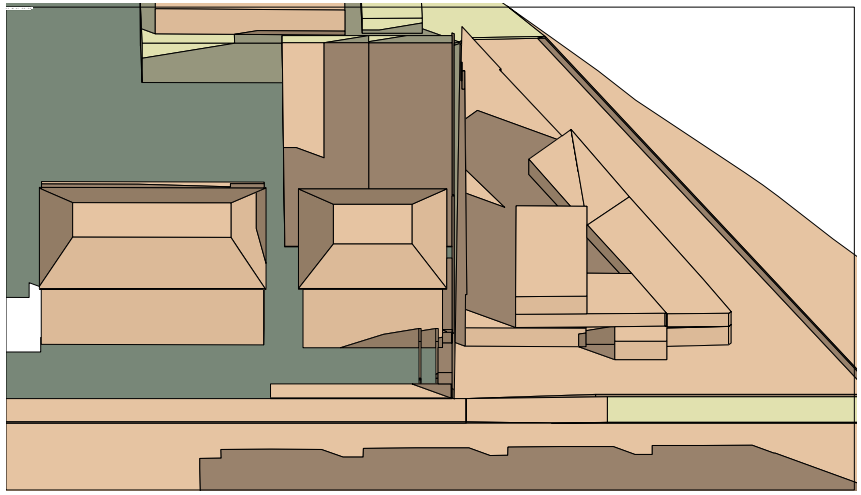




Proposed

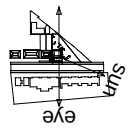
Suncast image:
View time = 21 Mar 08:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 112.77 alt = 16.58
Eye: azi = 180.00 alt = 60.00

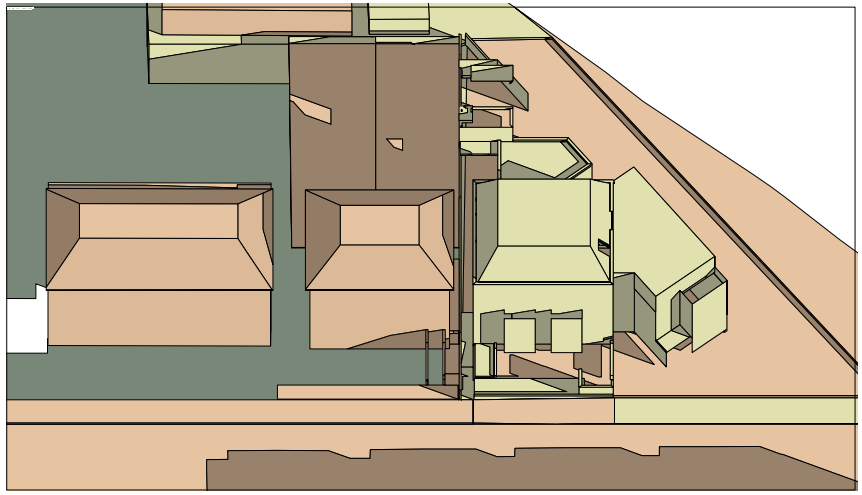




Existing

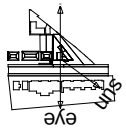
Suncast image:
View time = 21 Mar 08:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 112.77 alt = 16.58
Eye: azi = 180.00 alt = 60.00

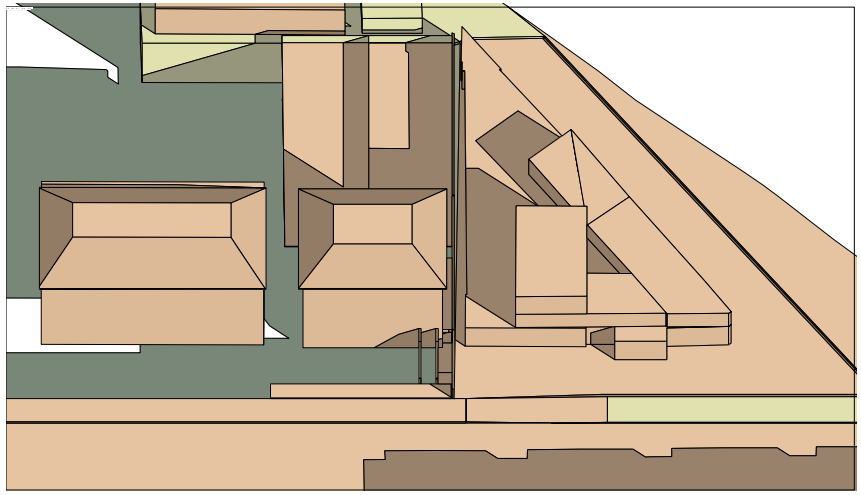




Proposed

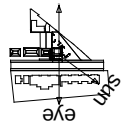
Suncast image:
View time = 21 Mar 09:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 126.27 alt = 24.69
Eye: azi = 180.00 alt = 60.00

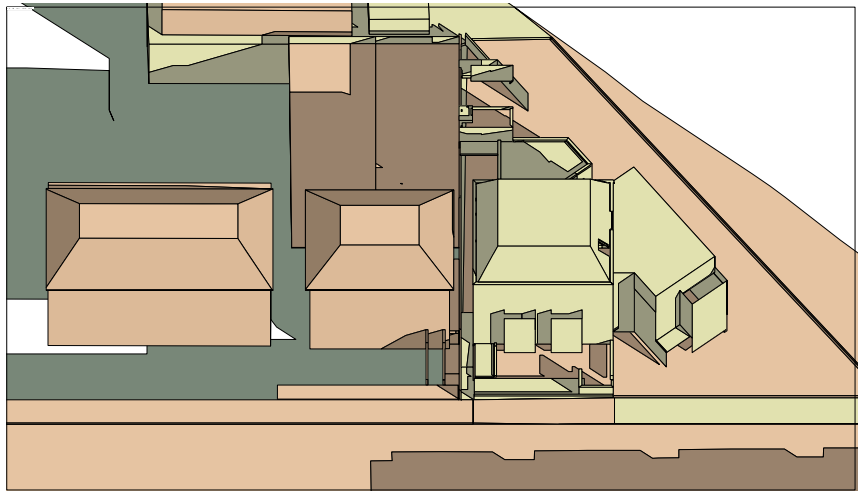




Existing

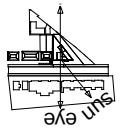
Suncast image:
View time = 21 Mar 09:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 126.27 alt = 24.69
Eye: azi = 180.00 alt = 60.00

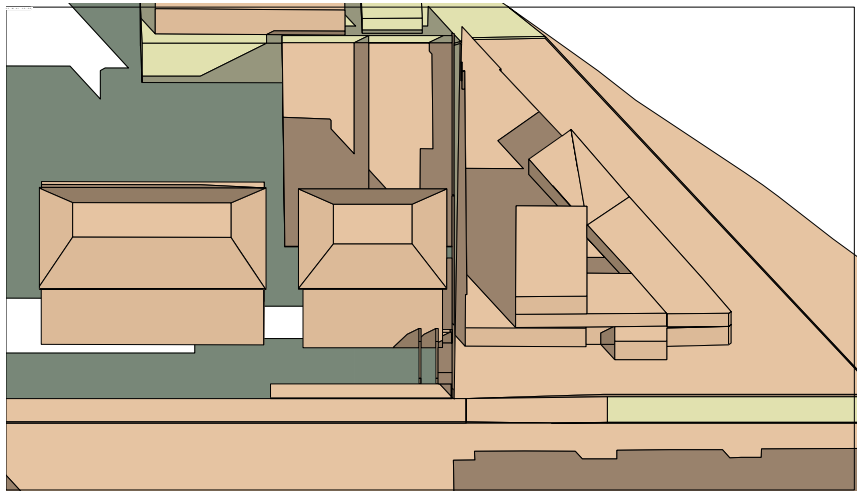




Proposed

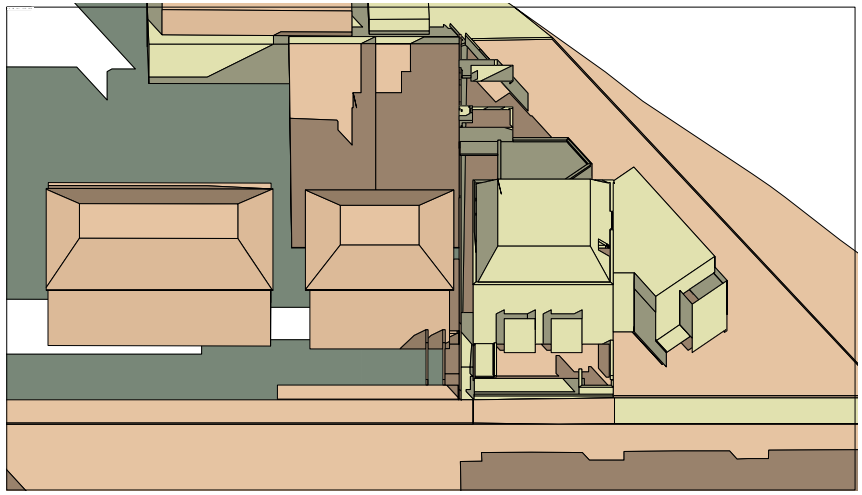
Suncast image:
View time = 21 Mar 10:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 141.49 alt = 31.41
Eye: azi = 180.00 alt = 60.00





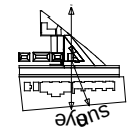
Existing

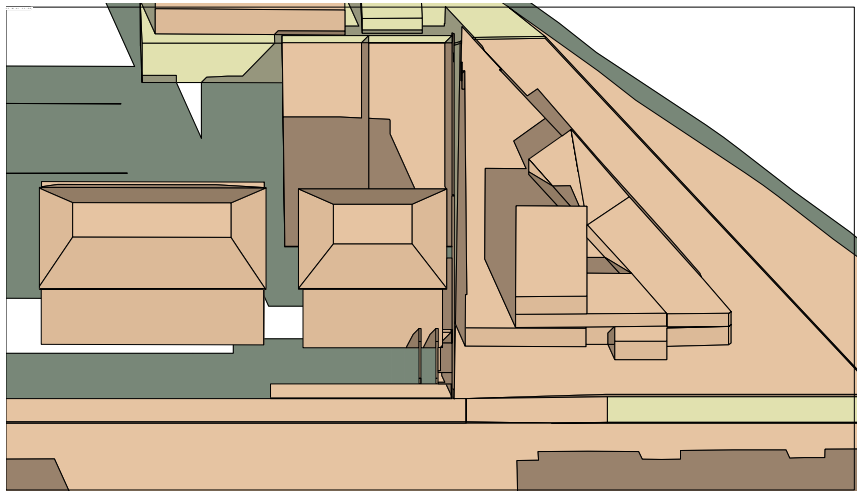
Suncast image:
View time = 21 Mar 10:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 141.49 alt = 31.41
Eye: azi = 180.00 alt = 60.00



Proposed

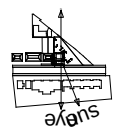
Suncast image:
View time = 21 Mar 11:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 158.67 alt = 36.07
Eye: azi = 180.00 alt = 60.00

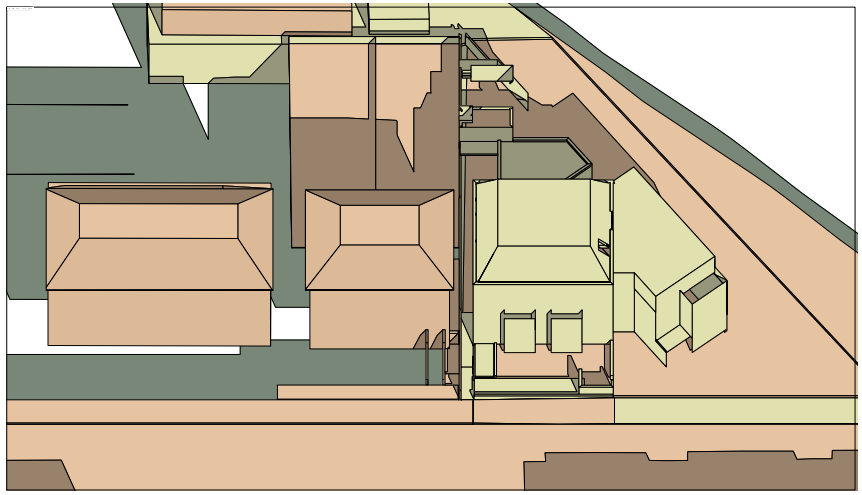




Existing

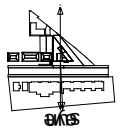
Suncast image:
View time = 21 Mar 11:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 158.67 alt = 36.07
Eye: azi = 180.00 alt = 60.00

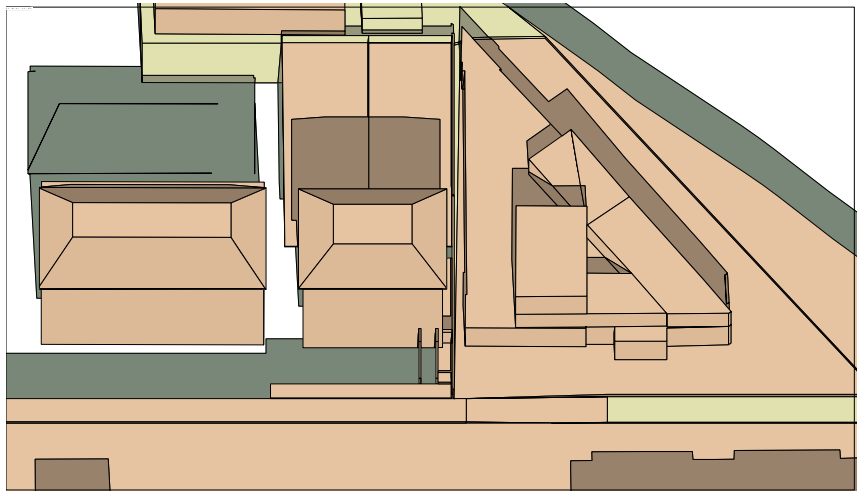




Proposed

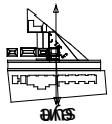
Suncast image:
View time = 21 Mar 12:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 177.33 alt = 38.01
Eye: azi = 180.00 alt = 60.00

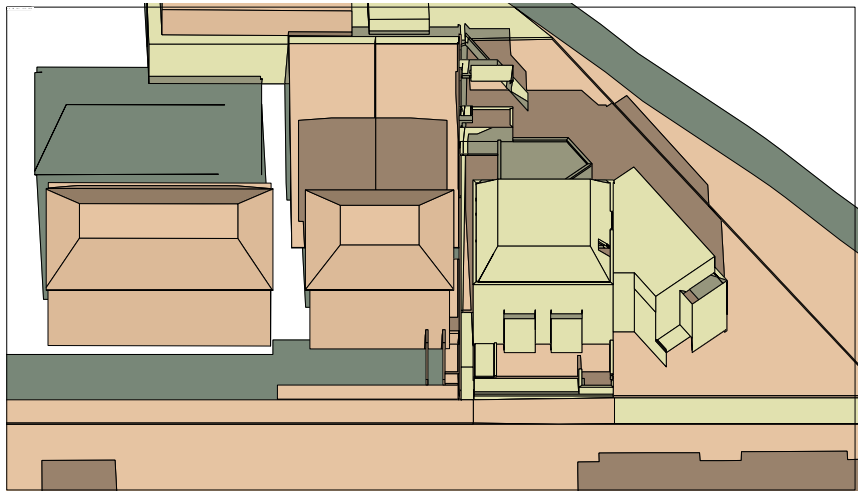




Existing

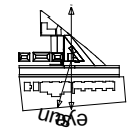
Suncast image:
View time = 21 Mar 12:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 177.33 alt = 38.01
Eye: azi = 180.00 alt = 60.00

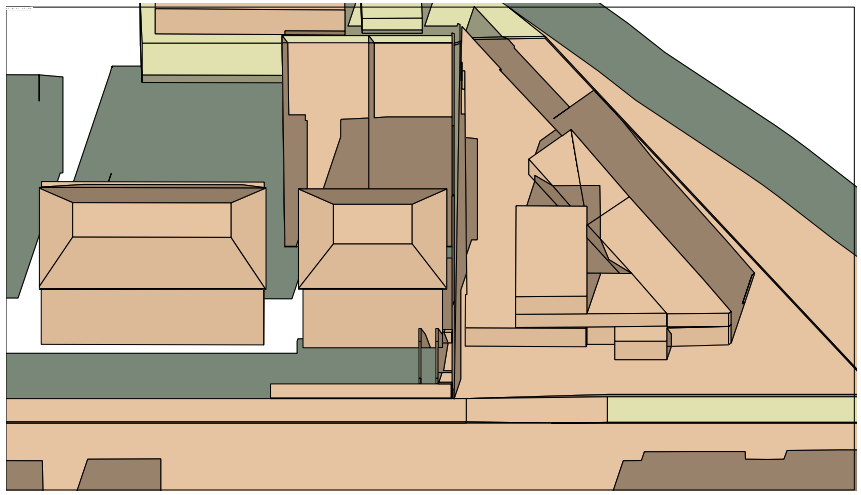




Proposed

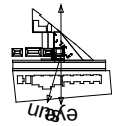
Suncast image:
View time = 21 Mar 13:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 196.21 alt = 36.91
Eye: azi = 180.00 alt = 60.00

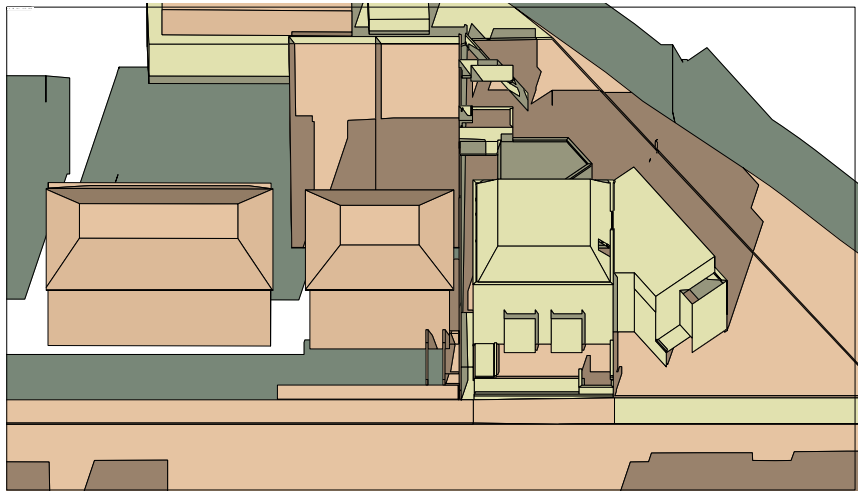




Existing

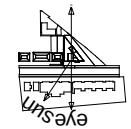
Suncast image:
View time = 21 Mar 13:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 196.21 alt = 36.91
Eye: azi = 180.00 alt = 60.00

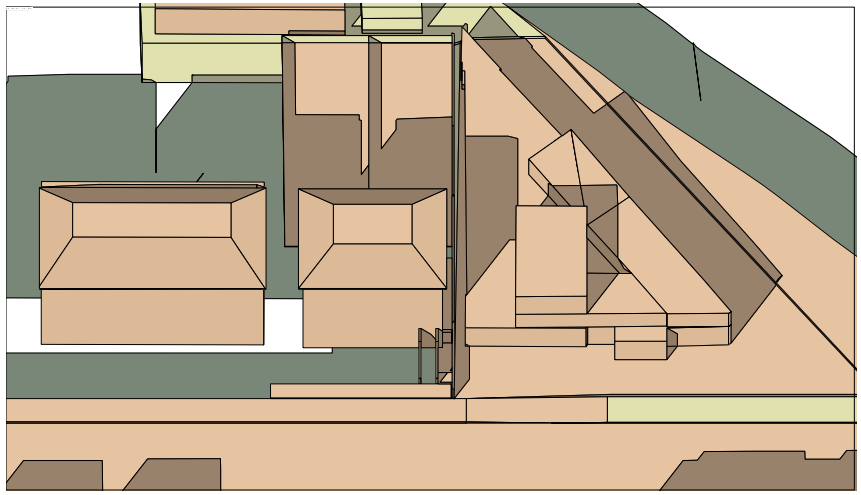




Proposed

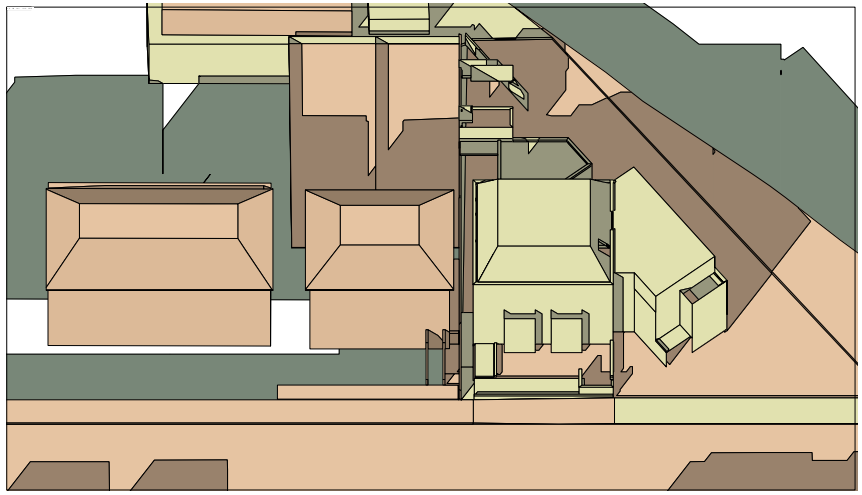
Suncast image:
View time = 21 Mar 14:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 213.89 alt = 32.95
Eye: azi = 180.00 alt = 60.00





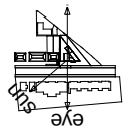
Existing

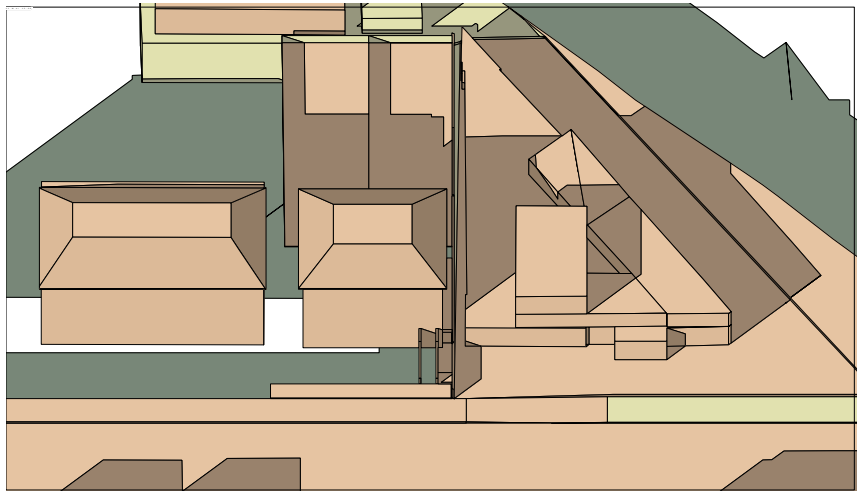
Suncast image:
View time = 21 Mar 14:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 213.89 alt = 32.95
Eye: azi = 180.00 alt = 60.00



Proposed

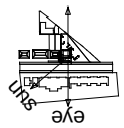
Suncast image:
View time = 21 Mar 15:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 229.66 alt = 26.74
Eye: azi = 180.00 alt = 60.00

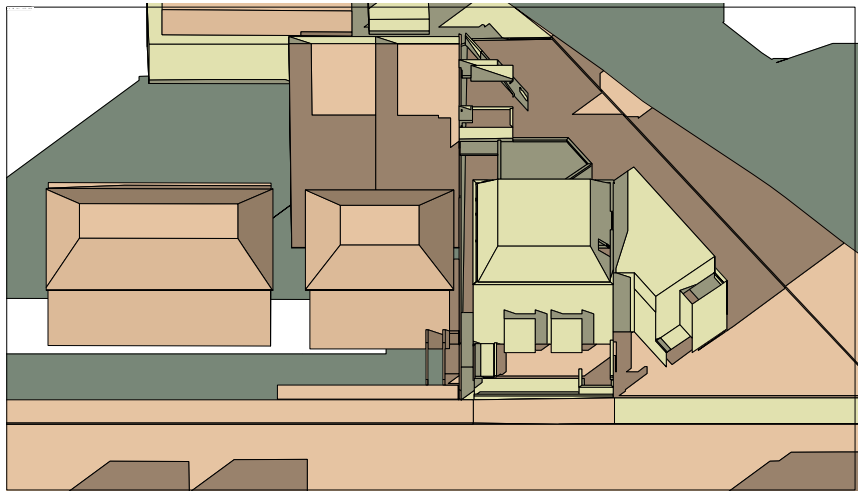




Existing

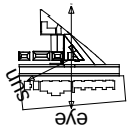
Suncast image:
View time = 21 Mar 15:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 229.66 alt = 26.74
Eye: azi = 180.00 alt = 60.00

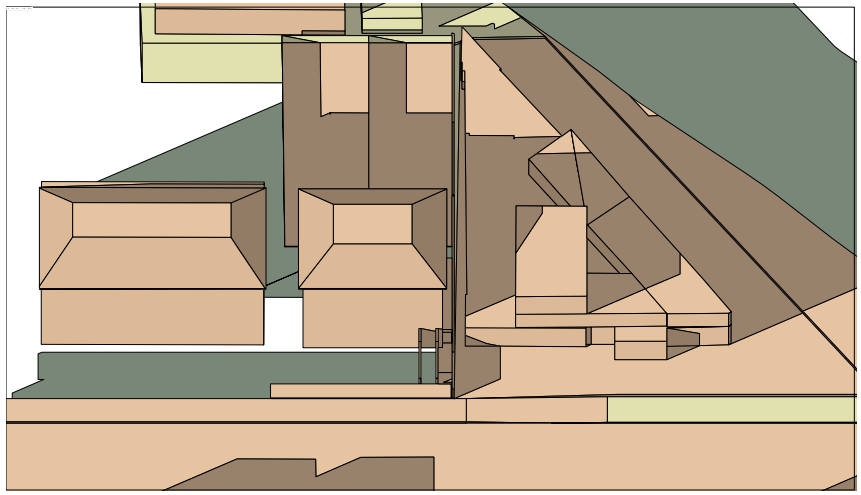




Proposed

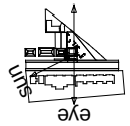
Suncast image:
View time = 21 Mar 16:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 243.60 alt = 18.96
Eye: azi = 180.00 alt = 60.00

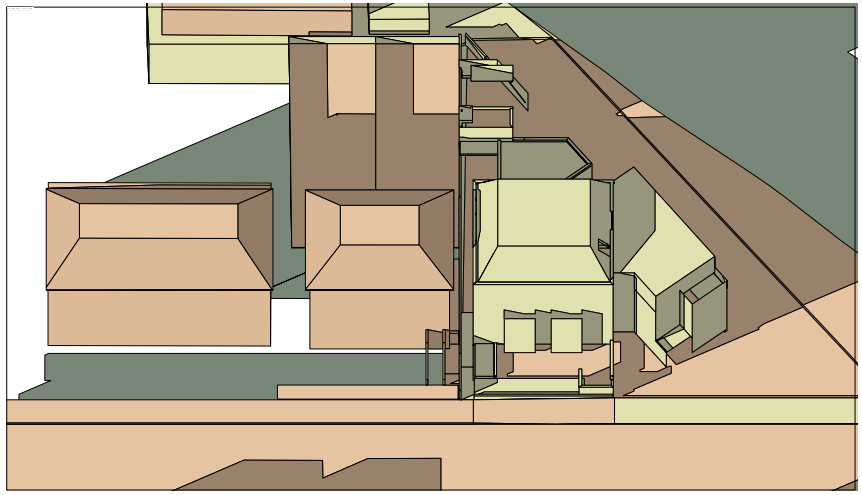




Existing

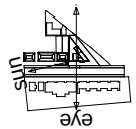
Suncast image:
View time = 21 Mar 16:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 243.60 alt = 18.96
Eye: azi = 180.00 alt = 60.00

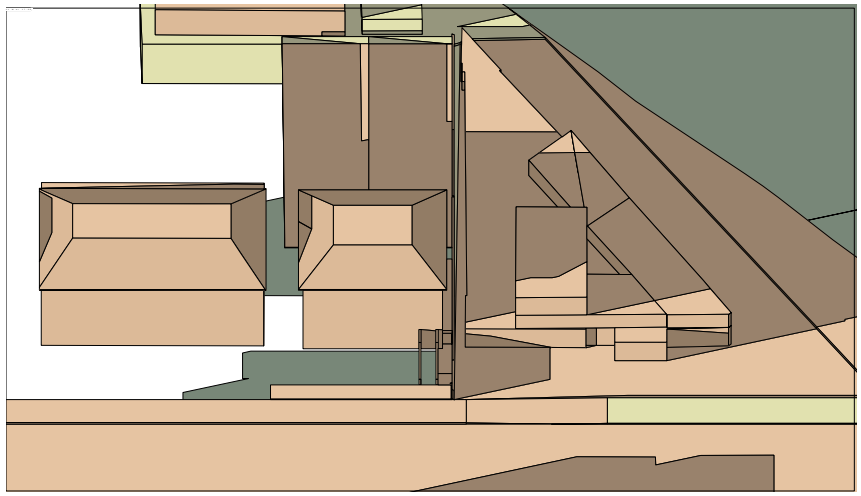




Proposed

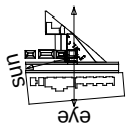
Suncast image:
View time = 21 Mar 17:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 256.20 alt = 10.21
Eye: azi = 180.00 alt = 60.00

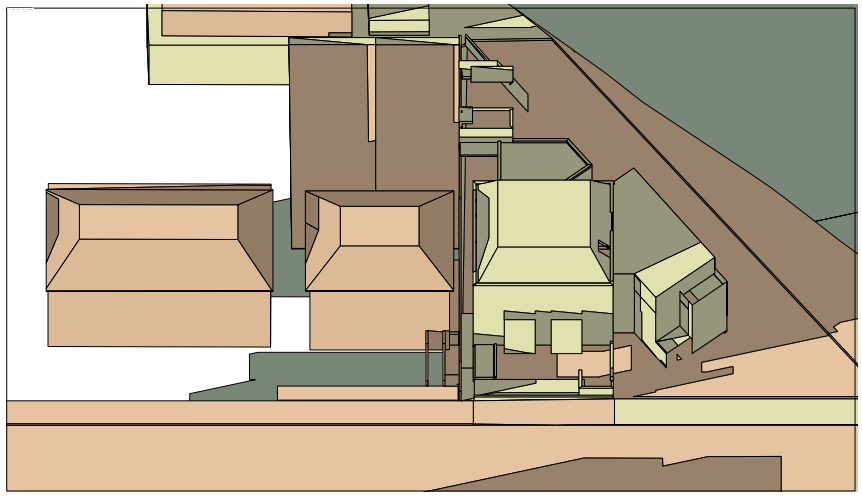




Existing

Suncast image:
View time = 21 Mar 17:00
Site Latitude = 51.55
Longitude diff. = -0.14
Model Bearing = 0.00
Sun: azi = 256.20 alt = 10.21
Eye: azi = 180.00 alt = 60.00





Proposed