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110 - 112 EAST STREET, BRISTOL

Daylight and Sunlight Impact Assessment Report

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Daylight and Sunlight Impact Assessment Report

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CONTENTS

EXECUTIVE SUMMARY

MACH has carried out a daylight and sunlight impact assessment of the proposed redevelopment of the property located at 110-112 East Street in Bedminster, Bristol. The assessment has been carried out as per the methodology provided within the BRE document 'BR209 – Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice (2022)'. For the assessment, two daylight models have been carried out, as follows:

1. Assessment of existing daylight and sunlight levels at the nearby properties.

2. Impact of the proposed development on existing adjacent properties and their amenity spaces.

The assessment has been based upon the provided architectural drawings, with the supplemental use of Google Maps and Google Earth for reference. The figure to the opposite shows the assessed existing site and adjacencies.

From the assessment, the following has been determined:

- It is shown that the majority of the assessed windows at the adjacent properties comfortably pass the BRE recommended guidelines for all daylight and sunlight metrics. The only window that does not meet BRE criteria, window 28 of 2 Warden Street, fails by less than 1%.
- It is important to note that, the BRE document is for guidance only and does not specify a strict set of criteria, stating that *"the used targets are purely advisory, and different targets may be used based on the special requirements of the proposed development or its location. Different criteria may be used based on the requirements for daylighting in an area viewed against other site layout constraints".* Within urban environments, it is common to allow for minor relaxations to the BRE guidance to not prohibit developments within city centres.
- Regarding the adjacent amenity spaces, it will have minimal to no impact from the proposed development hence the impact is seen to be acceptable.
- Therefore, it is predicted that the impact of the proposed development will be negligible.

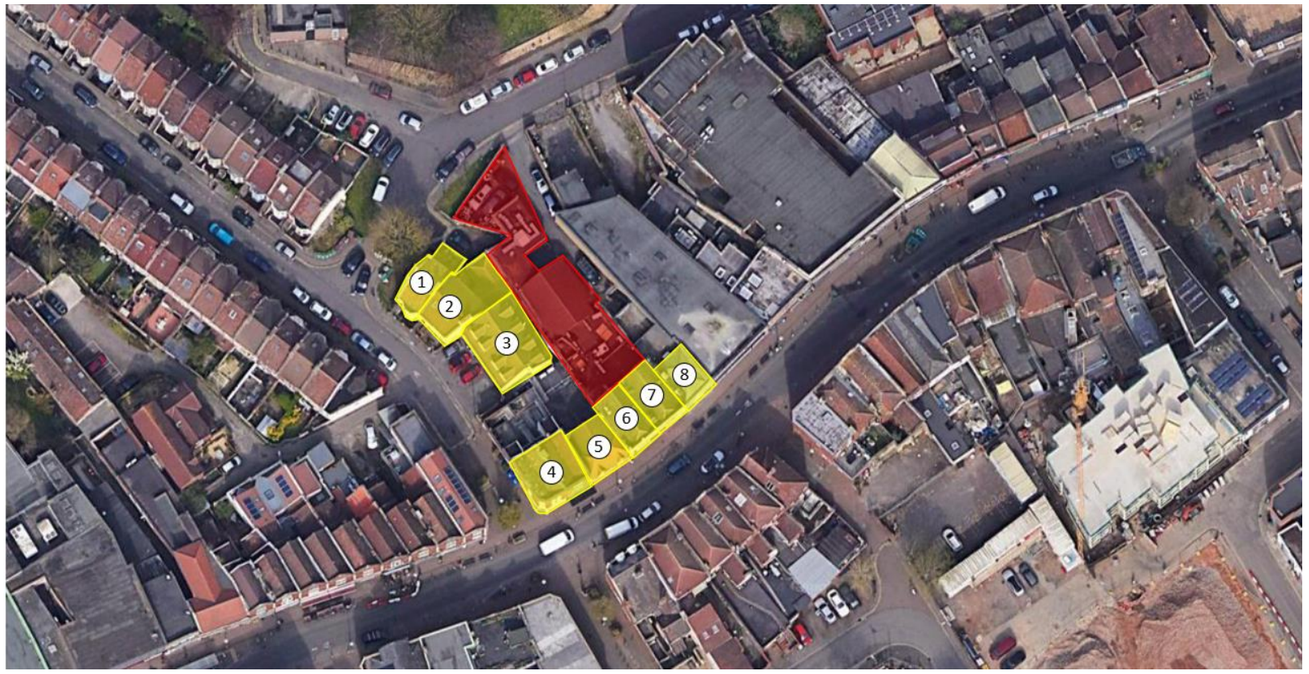


Figure 0.1: Top View of the Assessed Existing Site and Adjacencies

Assessed Property Name		Number of Assessed Windows	Number of BRE Passes		
			Assessed Windows		
			VSC	APSH	WPSH
1.	2 Warden Street	5	4	N/A	N/A
2.	4 Warden Street	5	5	N/A	N/A
3.	108 East Street	2	2	N/A	N/A
4.	110 East Street (Existing)	4	4	N/A	N/A
5.	112 East Street (Existing)	3	3	N/A	N/A
6.	114 – 116 East Street	4	4	N/A	N/A
7.	118 – 120 East Street	2	2	N/A	N/A
8.	Warden Court	12	12	N/A	N/A
Total		37	36 (97%)	N/A	N/A

Table 0.1 Daylight and Sunlight Impact Assessment Results Summary

1 INTRODUCTION

This report outlines a daylight and sunlight impact assessment of the proposed development at 110-112 East Street, Bristol. The purpose of this assessment is to evaluate the daylight and sunlight impact of the proposed development on the existing adjacent properties.

This document details the methodology and results of the external daylight assessment, which have been carried out using 3D daylight modelling software.

2 PROPOSED DEVELOPMENT

The proposed development is to include the demolition of the annexe properties at 110-112 East Street and the erection of a three-storey building that will provide 16 bedrooms in a co-living arrangement.

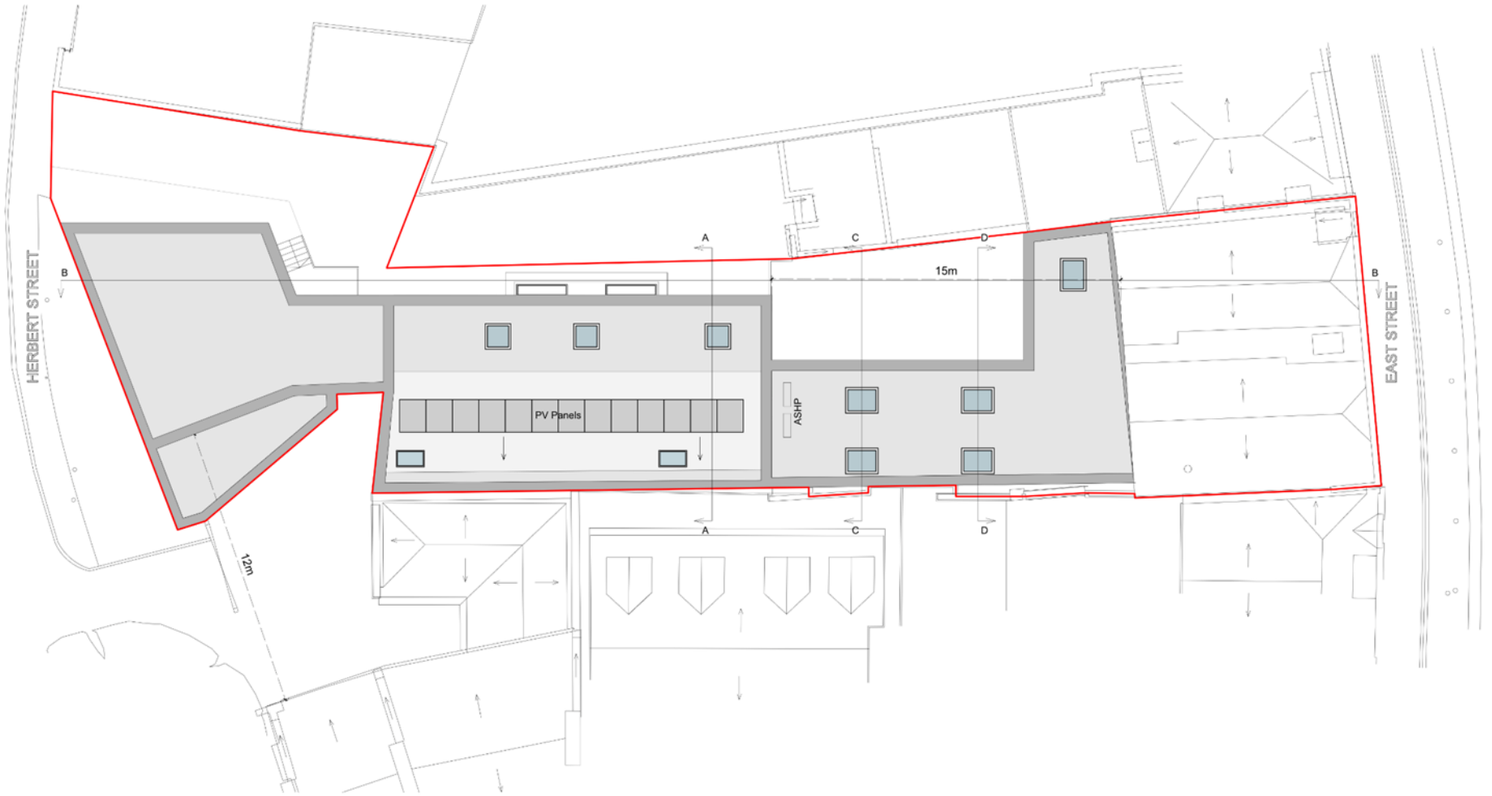


Figure 2.1: Proposed Site Plan

The figures to the opposite and on the next page show the floor plans of the proposed development.

Figure 2.2 Proposed Ground Floor Plan

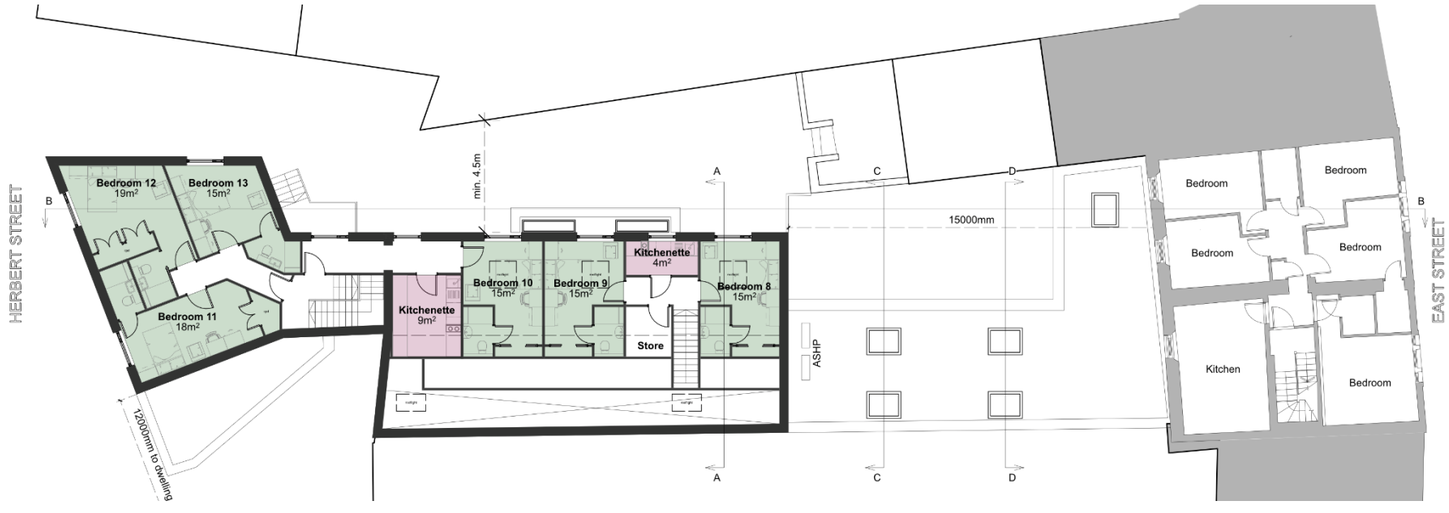


Figure 2.3 Proposed First Floor Plan

The figure to the opposite depicts the second floor plan of the proposed development.

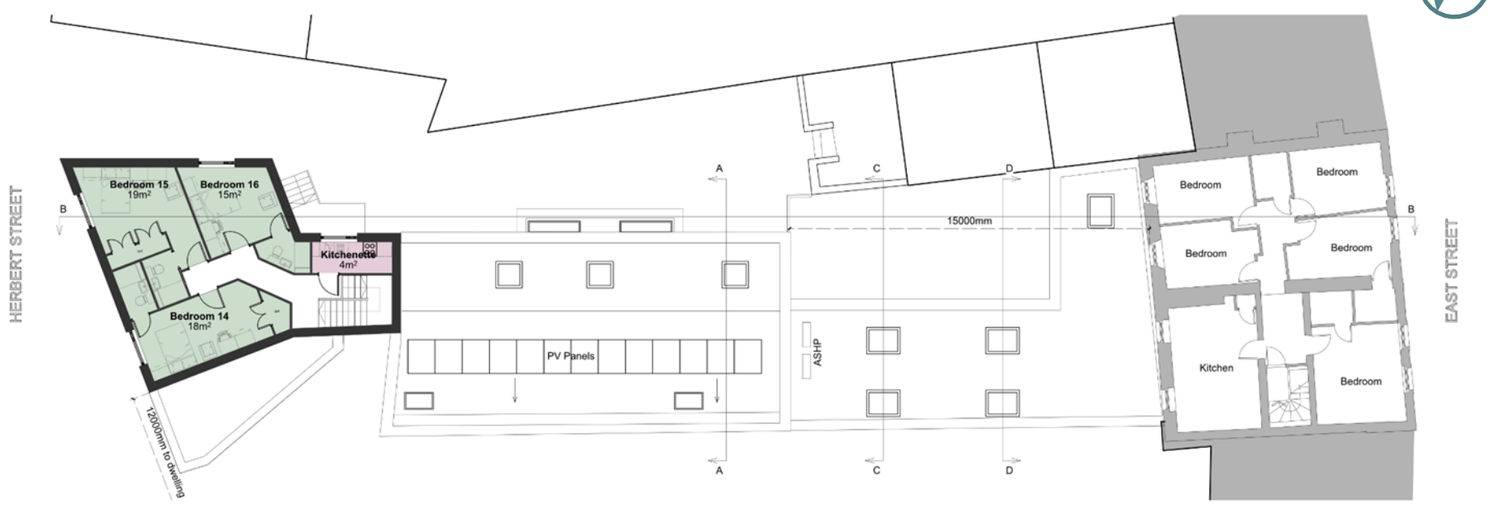


Figure 2.4 Proposed Second Floor Plan

The figures to the opposite and on the following pages represent the elevations and sections of the proposed development.

Figure 2.5 Proposed North East Elevation

Figure 2.6 Proposed North East Elevation & Section BB

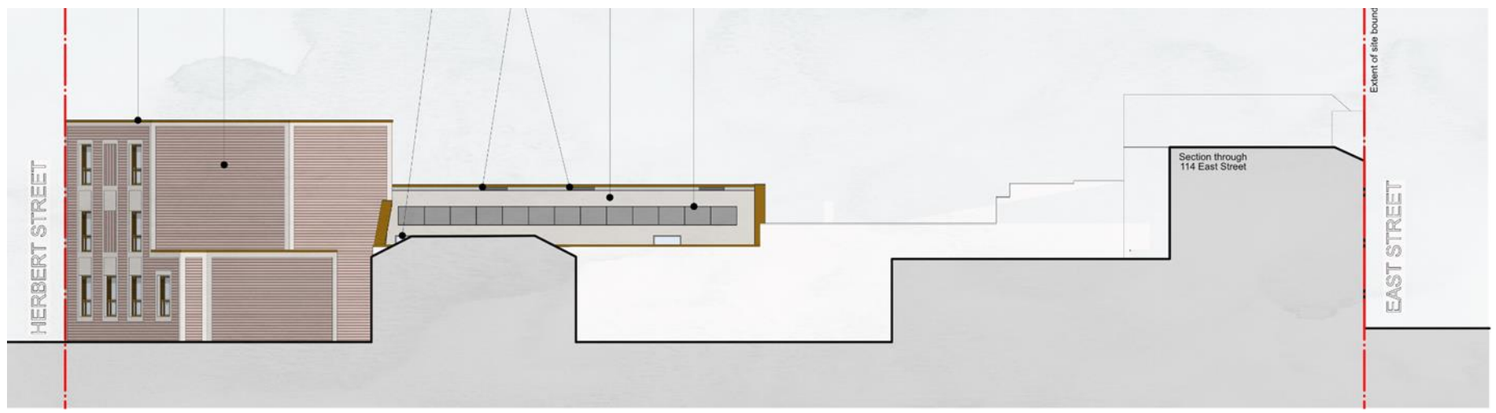


Figure 2.7 Proposed South West Elevation

The figures to the opposite depict a selection of elevations of the proposed development.

Figure 2.8 Proposed North West Elevation

Figure 2.9 Proposed South East Elevation

The figures to the opposite depict the sections of the development.

Figure 2.10 Proposed Section / Elevation AA

Figure 2.11 Proposed Section / Elevation CC

Figure 2.12 Proposed Section / Elevation DD

3 ASSESSMENT METHODOLOGY

3.1 BRE BR209 – Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice (2022)

The BRE guidance provides advice on site layout planning to help achieving good daylighting and sun-lighting within buildings and in the open spaces between them. It also gives guidance on site layout for solar energy, on sunlight of gardens and amenity spaces. The guide is not mandatory, it aims to help ensure good conditions in the local environment or between buildings rather than constrain the designer. Hence, although it provides numerical guidelines, these guidelines should be interpreted flexibly since natural lighting is only one of many factors in site layout design.

Three methods are adopted to determine the level of impact the proposed development has on adjacent properties, shown opposite.

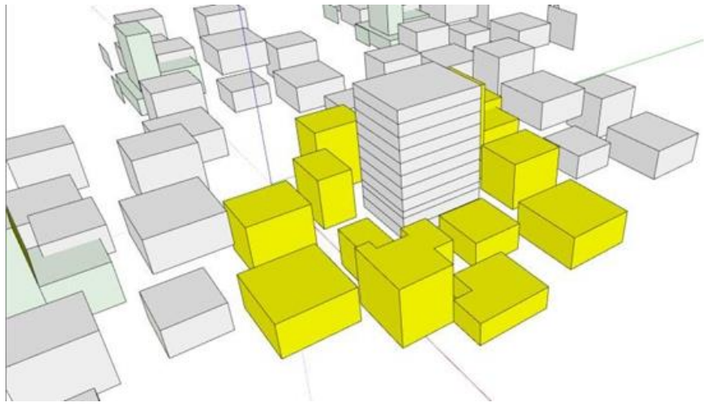
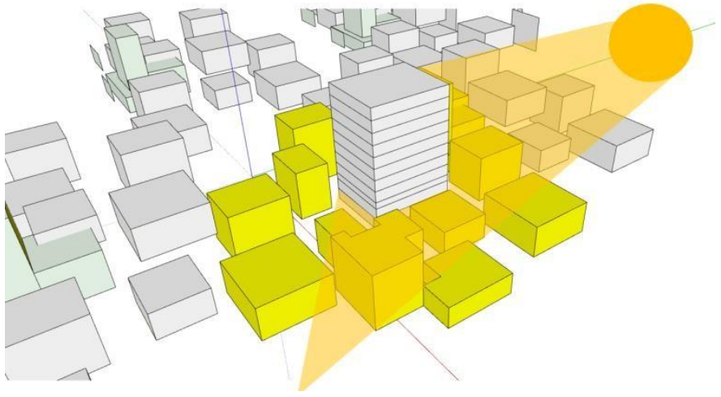
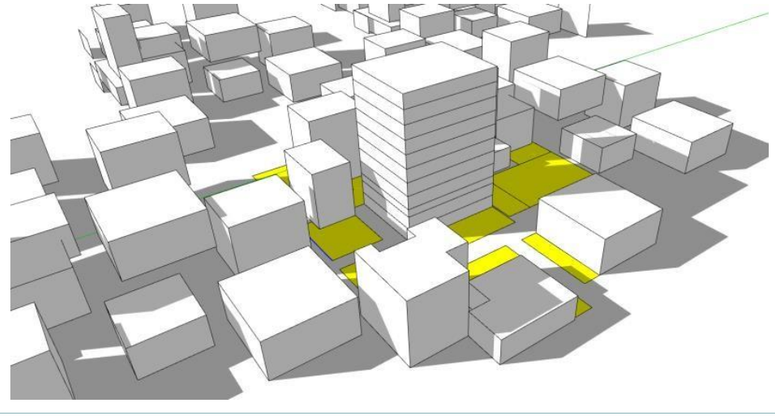
Assessment Methods	Description
Daylight Impact on Existing Buildings	
Sunlight Impact on Existing Buildings	
Sunlight Impact on Gardens and Amenity spaces	

Table 3.3.1: Types of Impact Assessments

3.1.1 Daylight Impact on Existing Buildings

3.1.1.1 Vertical Sky Component Method

The VSC is a unit of measurement that represents the amount of available daylight from the sky, received at a particular window. It is measured on the outside face of the window. This unit is expressed as a percentage as it is the ratio between the amount of sky visible at the given reference point compared to the amount of light that would be available from an unobstructed hemisphere of sky. The maximum percentage value for a window with a completely unobstructed view through 90° in every direction is 40%.

In order to maintain good levels of daylight the BRE guidance recommend that the VSC of a window should be 27% or greater. Where this level is not achieved, an additional assessment called the Comparison Method should be carried out.

Result	Description	Pass/Fail
VSC > 27%	Enough skylight should still be reaching the window of the existing building	Pass
VSC < 27% & VSC Change % < 20%	The area lit by the window is likely to appear gloomy, However, the reduction is likely unnoticed	Pass
VSC < 27% & VSC Change % > 20%	A reduction will be noticed in the amount of skylight	Fail

Table 3.3.2: Vertical Sky Component Pass Criteria

3.1.1.2 Comparison Method

The comparison test considers the VSC results of the baseline condition and the VSC results of the Development in place. BR209 states that where the predicted VSC at nearby dwellings is less than 27%, then a comparison with the existing situation should be analysed. If the VSC is less than 80% of its former value, occupants of the existing building will notice a reduction in the amount of daylight.

As stated in the BRE Guidance, these guidelines are intended for use where daylight is required, including, living rooms, kitchens, and bedrooms which are referred to as (daylight sensitive spaces). Windows to bathrooms, storerooms, circulation spaces, and garages do not need to be analysed, which are referred to as non-sensitive spaces.

The table to the opposite shows the predicted impact based on the calculated VSC values, while the figures below show the Waldram diagram for the window highlighted in red. The block highlighted in blue is the existing and the one highlighted in yellow is the proposed.

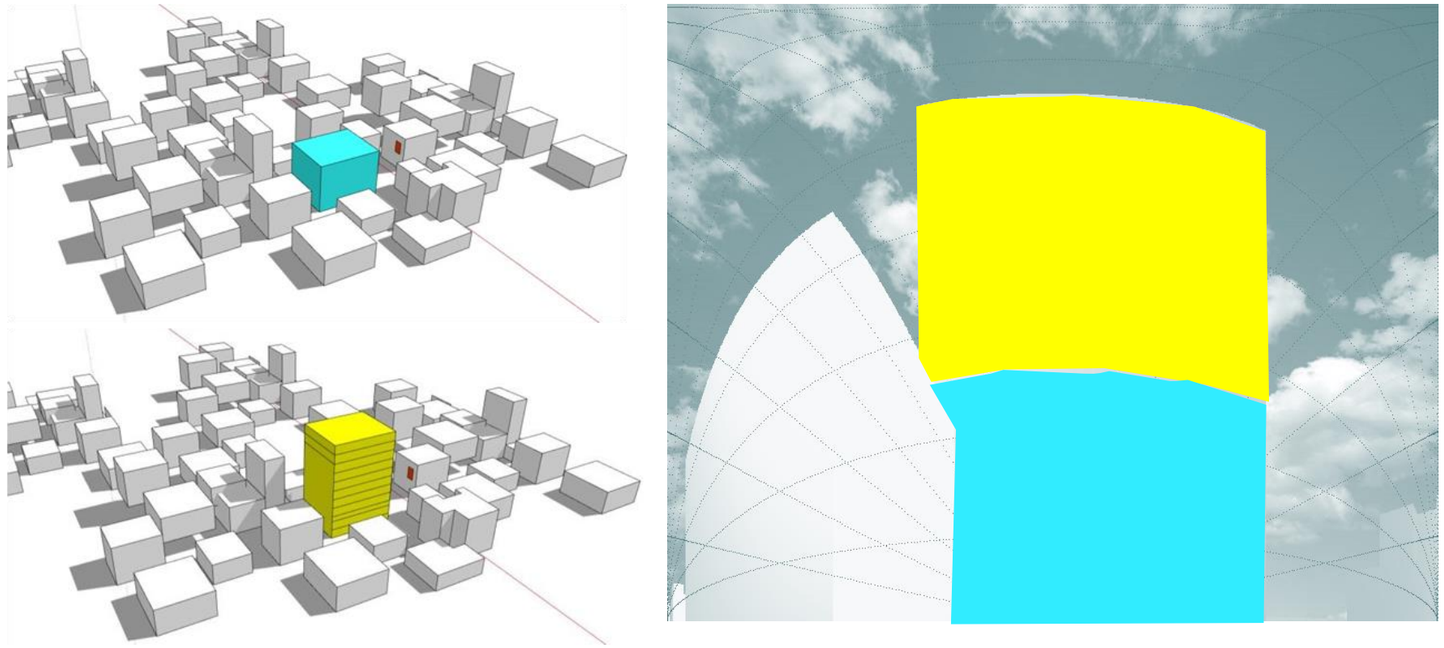


Figure 3.1: Example Waldram Diagram for VSC results – existing shown in blue and proposed in yellow

3.1.2 Sunlight Impact on Existing Buildings

BR209 states that sunlight impact on nearby properties should be assessed if there is a living room with a window that faces 90° of due south. Where this is the case, a sunlight impact may occur if the centre of the window:

- Receives less than 25% of Annual Probable Sunlight Hours (APSH), or less than 5% of Winter Probable Sunlight Hours between 21 September and 21 March.
- Receives less than 0.8 times its former sunlight hours during either period.
- Has a reduction in sunlight over the whole year greater than 4% of annual probable sunlight hours.

If the impacted room has multiple windows on the same wall, the highest value of APSH should be taken. if the room has two windows on opposite walls, the APSH due to each can be added together.

The APSH value is important to consider within living rooms, kitchens and bedrooms are less important, although care should be taken not to majorly impact the amount of sun reaching that room.

The table to the opposite shows the predicted impact based on the calculated APSH and WPSH values.

Result	Description	Pass/Fail
APSH > 25% WPSH > 5%	Room still receives enough sunlight	Pass
APSH < 25% & APSH Change % < 20% WPSH < 5% & WPSH Change % < 20%	the room would appear cold; however, the reduction is likely unnoticed	Pass
APSH < 25% & APSH Change % > 20% WPSH < 5% & WPSH Change % > 20%	A reduction of sunlight will be noticed	Fail

Table 3.3: Sunlight Impact Pass Criteria

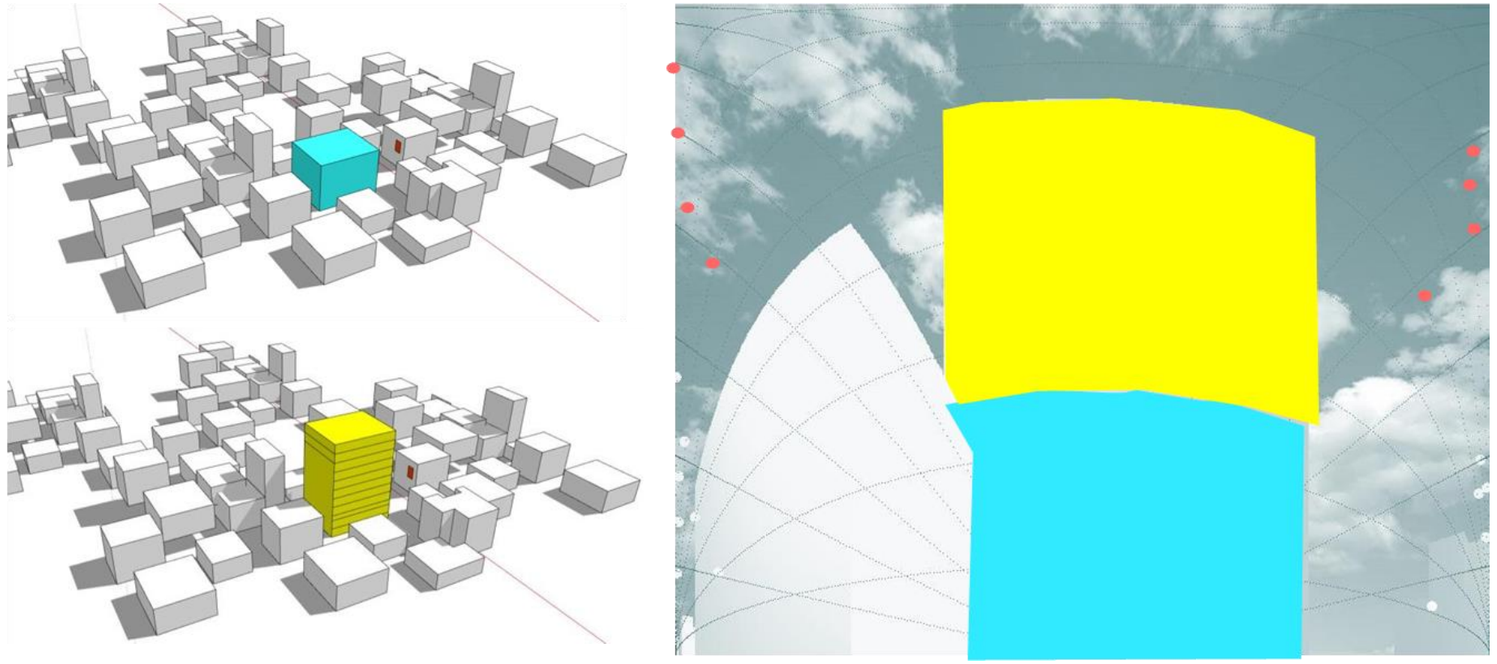


Figure 3.2: Example Waldram Diagram for APSH results for the Window Highlighted in Red – Existing Shown in Blue and Proposed in Yellow

3.1.3 Sunlight Impact on Gardens and Amenity Spaces

- The BRE guidance recommends that for an outdoor amenity space to appear adequately sunlit throughout the year, at least half of the garden or the amenity space should receive at least 2 hours of sunlight on 21 March.

- If because of the new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21 March is less than 80% of its former values, then the loss of light is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March.

The example figure opposite shows the existing development in blue, the proposed development in yellow, and shading across the adjacent amenity spaces in green.

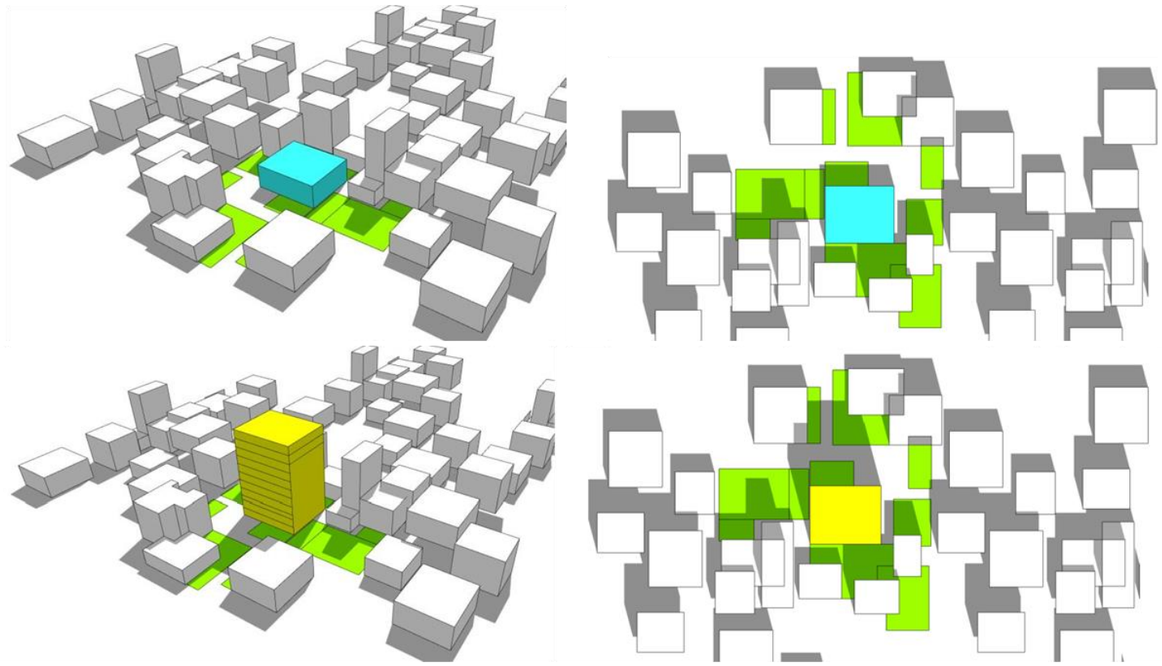


Figure 3.3: Example Shadow Plots for the Adjacent Amenity Spaces

4 DAYLIGHT AND SUNLIGHT IMPACT ASSESSMENT

4.1 Nearest Sensitive Properties

The potentially sensitive properties and amenities adjacent to the proposed development have been identified as the following:

1. 4 Warden Street
2. 2 Warden Street
3. Warden Court
4. 118-120 East Street
5. 114-116 East Street
6. 112 East Street (First and Second Floor)
7. 110 East Street (First and Second Floor)
8. 108 East Street

The buildings and amenity identified above and highlighted in yellow to the opposite are closest in proximity and thereby can be seen as a worst-case scenario assessment regarding daylight impact.

Assessed windows at the adjacent properties have been marked up and referred in the drawings shown on the following pages.

Figure 4.1 Existing Site (in Red) and Adjacent Assessed Properties (in Yellow)

4.2 Assessment Results for The Adjacent Properties

4.2.1 Window Locations

The figures opposite show the assessed windows at the adjacent properties located at 108, 110, and 112 East Street. Despite being at the same address as the proposed development, only the ground floor of the main building at 110-112 East Street will be altered. The upper two floors will remain as they are and are therefore taken into consideration for the daylight and sunlight impact assessment.

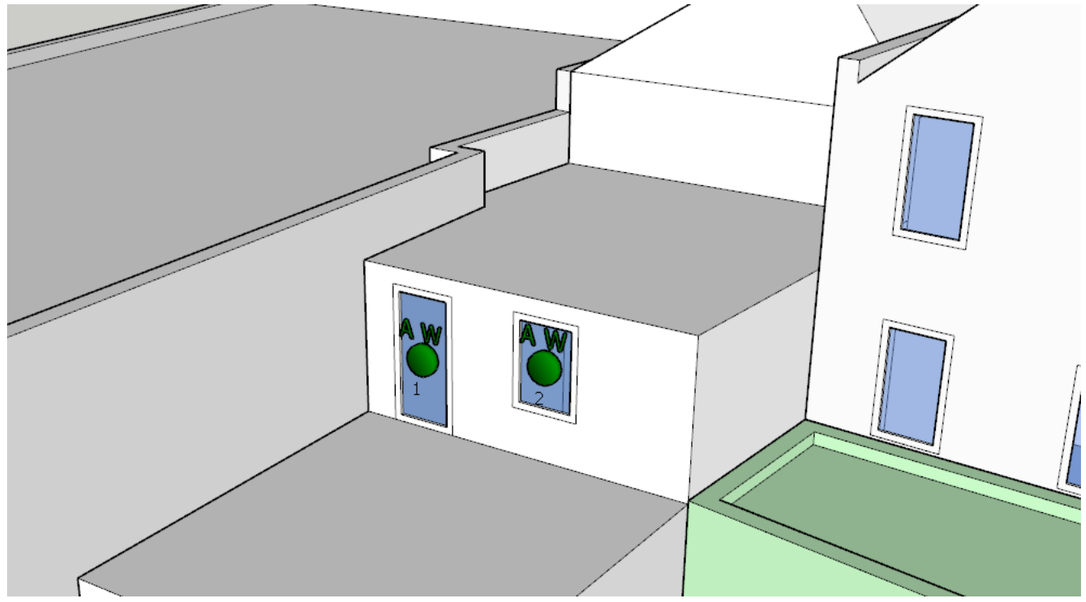


Figure 4.2 Assessed Windows at 108 East Street

Figure 4.3 Assessed Windows at 110 (left) and 112 (right) East Street

The figures opposite show the assessed windows at the adjacent properties located at 114-116, and 118-120 East Street.

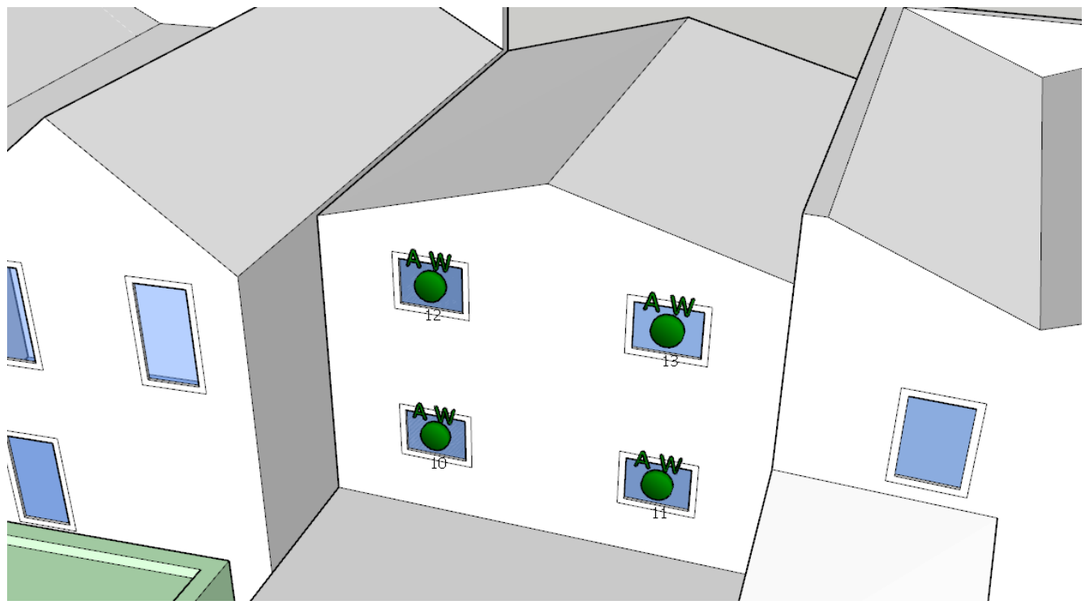


Figure 4.4 Assessed Windows at 114-116 East Street

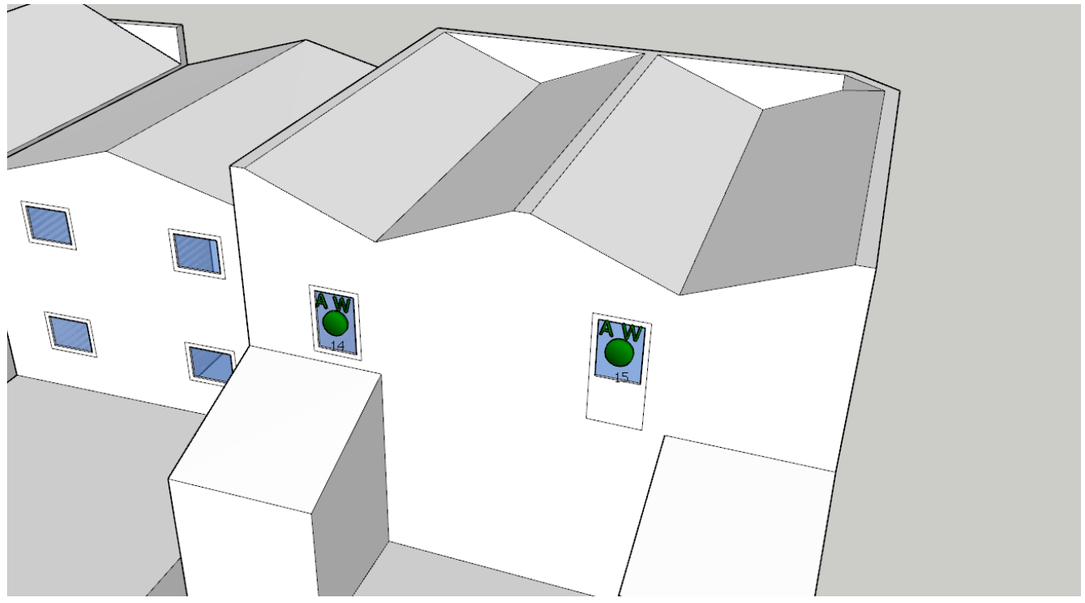


Figure 4.5 Assessed Windows at 118-120 East Street

The figure opposite shows the assessed windows at Warden Court and 2 Warden Street.

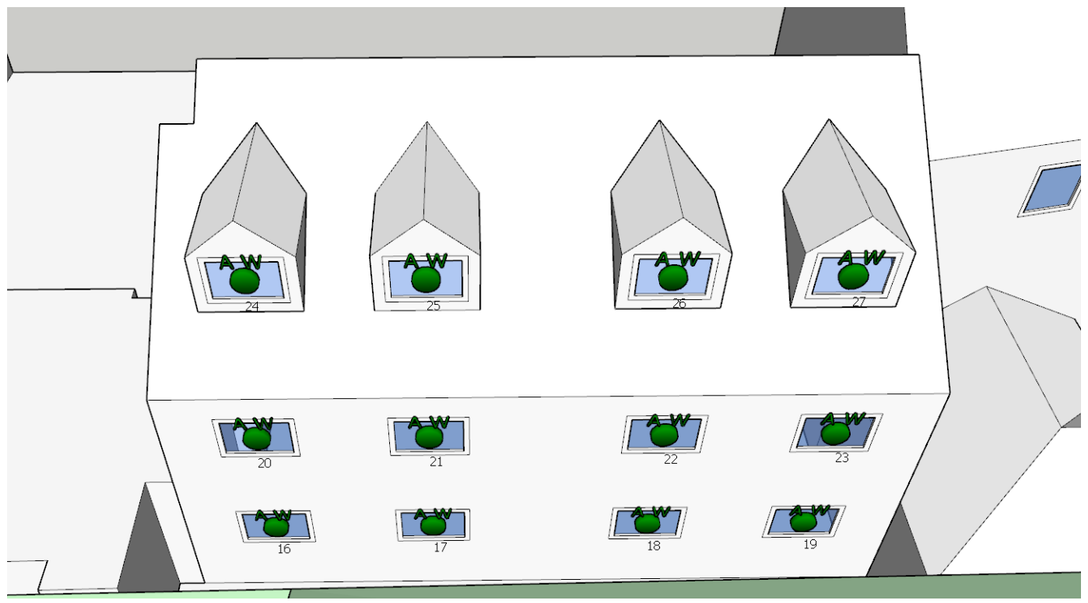


Figure 4.6 Assessed Windows at Warden Court

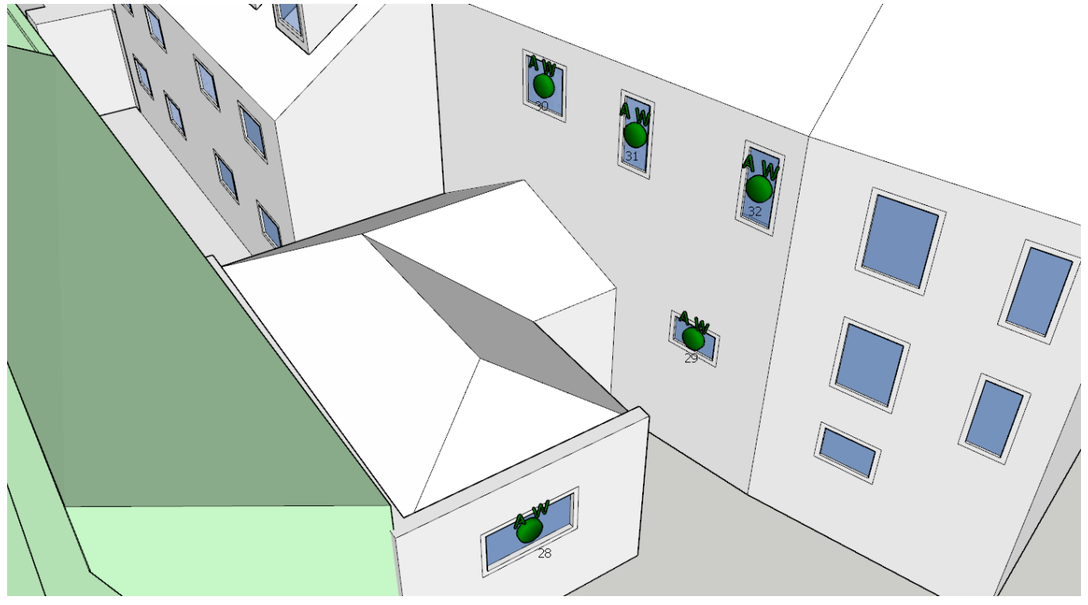


Figure 4.7 Assessed Windows at 2 Warden Street

The figure opposite shows the assessed windows at 4 Warden Street.

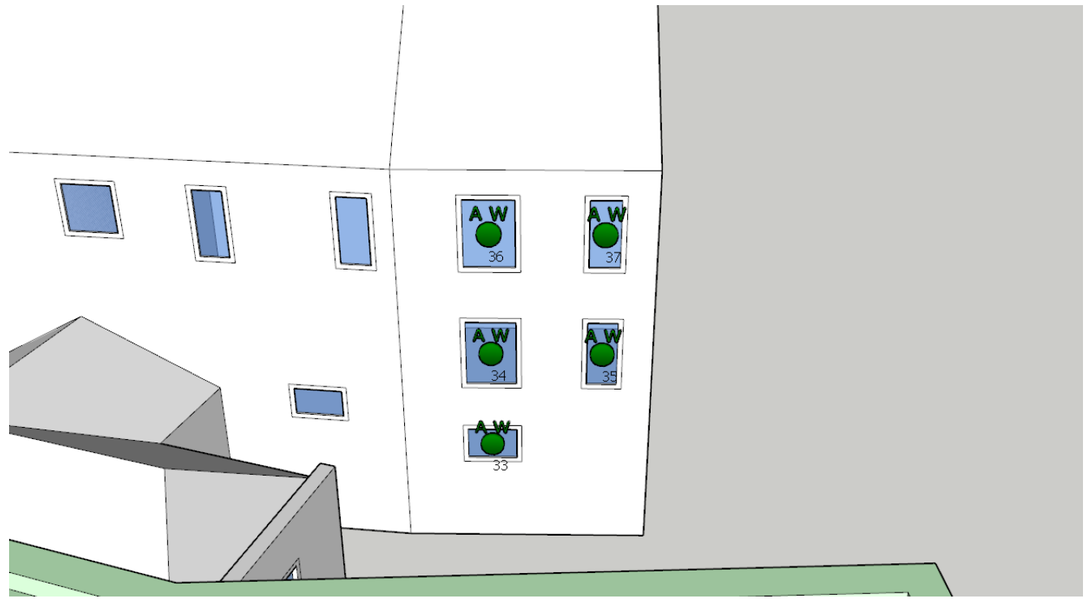


Figure 4.8 Assessed Windows at 4 Warden Street

4.2.2 Daylight and Sunlight Impact Assessment

The table opposite presents the predicted VSC, APSH, and WPSH results for the adjacent properties.

The assessment indicates that the majority of windows in the adjacent properties comfortably meet the BRE recommended guidelines for all daylight and sunlight metrics.

The only exception is Window 28 at 2 Warden Street, which falls marginally below the VSC threshold by less than 1%, with a final VSC of 26.6 instead of 27. The 23% reduction remains within acceptable limits, particularly in urban areas where a reduction of up to 30% is generally considered reasonable.

Overall, the proposed development is expected to have a negligible impact on daylight and sunlight levels in the assessed adjacent buildings.

Property Name	Window Ref.	Orientation	Predicted VSC				Predicted APSH				Predicted WPSH			
			Before	After	Change	Pass/Fail	Before	After	Change	Pass/Fail	Before	After	Change	Pass/Fail
108 East Street	1	Northwest	24.8	23.9	4%	Pass	-	-	-	N/A	-	-	-	N/A
	2	Northwest	32.7	31.8	3%	Pass	-	-	-	N/A	-	-	-	N/A
110 East Street	3	Northwest	31.0	30.5	2%	Pass	-	-	-	N/A	-	-	-	N/A
	4	Northwest	35.0	34.6	1%	Pass	-	-	-	N/A	-	-	-	N/A
	5	Northwest	38.6	38.4	0%	Pass	-	-	-	N/A	-	-	-	N/A
	6	Northwest	38.6	38.4	0%	Pass	-	-	-	N/A	-	-	-	N/A
112 East Street	7	Northwest	35.3	35.0	1%	Pass	-	-	-	N/A	-	-	-	N/A
	8	Northwest	38.5	38.3	0%	Pass	-	-	-	N/A	-	-	-	N/A
	9	Northwest	38.4	38.3	0%	Pass	-	-	-	N/A	-	-	-	N/A
114-116 East Street	10	Northwest	29.0	28.7	1%	Pass	-	-	-	N/A	-	-	-	N/A
	11	Northwest	28.8	28.6	1%	Pass	-	-	-	N/A	-	-	-	N/A
	12	Northwest	34.9	34.7	0%	Pass	-	-	-	N/A	-	-	-	N/A
	13	Northwest	34.8	34.7	0%	Pass	-	-	-	N/A	-	-	-	N/A
118-120 East Street	14	Northwest	38.0	38.0	0%	Pass	-	-	-	N/A	-	-	-	N/A
	15	Northwest	38.2	38.2	0%	Pass	-	-	-	N/A	-	-	-	N/A
Warden Court	16	Northeast	21.2	21.1	0%	Pass	-	-	-	N/A	-	-	-	N/A
	17	Northeast	21.2	21.4	+1%	Pass	-	-	-	N/A	-	-	-	N/A
	18	Northeast	23.5	21.1	10%	Pass	-	-	-	N/A	-	-	-	N/A
	19	Northeast	23.2	20.6	11%	Pass	-	-	-	N/A	-	-	-	N/A
	20	Northeast	33.7	33.4	1%	Pass	-	-	-	N/A	-	-	-	N/A
	21	Northeast	33.9	33.4	1%	Pass	-	-	-	N/A	-	-	-	N/A
	22	Northeast	34.2	32.6	5%	Pass	-	-	-	N/A	-	-	-	N/A
	23	Northeast	34.8	32.0	8%	Pass	-	-	-	N/A	-	-	-	N/A
	24	Northeast	37.9	37.8	0%	Pass	-	-	-	N/A	-	-	-	N/A
	25	Northeast	38.3	38.1	1%	Pass	-	-	-	N/A	-	-	-	N/A
	26	Northeast	38.6	38.2	1%	Pass	-	-	-	N/A	-	-	-	N/A
	27	Northeast	38.7	38.1	2%	Pass	-	-	-	N/A	-	-	-	N/A
2 Warden Street	28	Northwest	34.6	26.6	23%	Fail*	-	-	-	N/A	-	-	-	N/A
	29	Northeast	32.4	27.2	16%	Pass	-	-	-	N/A	-	-	-	N/A
	30	Northeast	38.4	36.6	5%	Pass	-	-	-	N/A	-	-	-	N/A
	31	Northeast	38.5	36.1	6%	Pass	-	-	-	N/A	-	-	-	N/A
	32	Northeast	38.7	35.9	7%	Pass	-	-	-	N/A	-	-	-	N/A
4 Warden Street	33	Northeast	35.1	27.5	22%	Pass	-	-	-	N/A	-	-	-	N/A
	34	Northeast	37.9	32.0	16%	Pass	-	-	-	N/A	-	-	-	N/A
	35	Northeast	37.9	32.6	14%	Pass	-	-	-	N/A	-	-	-	N/A
	36	Northeast	39.0	36.1	7%	Pass	-	-	-	N/A	-	-	-	N/A
	37	Northeast	38.8	36.1	7%	Pass	-	-	-	N/A	-	-	-	N/A

* A VSC reduction of 23% is considered acceptable in urban areas, where reductions of up to 30% are typically deemed reasonable.

Table 4.1: Daylight and Sunlight Impact Assessment Results for the Adjacent Dwelling

4.3 Outdoor Amenity Spaces

This section reviews the availability of direct sunlight within adjacent outdoor amenity areas in accordance with BRE guidance. The figures to the opposite show predicted shading across the existing adjacent amenity spaces on the 21st of March, as per BRE guidance on assessing sunlight to outdoor amenity areas. Screenshots are from the modelling software, showing the overall overshadowing within the adjacent amenity spaces with the proposed development (highlighted in light green) from 09:00 to 15:00.

The figures and table opposite demonstrate that the proposed development will have minimal to no adverse impact on the adjacent amenity spaces.

Furthermore, daylighting conditions at 108 East Street are expected to improve, as the proposed development will allow for increased sunlight exposure in the yard compared to existing conditions.

- Areas that receive Sunlight for more than 2 hours
- Areas that receive Sunlight for more than 1.5 hours
- Areas that receive Sunlight for more than 1.0 hours
- Areas that receive Sunlight for more than 0.5 hours
- Areas that receive Sunlight for less than 0.5 hours

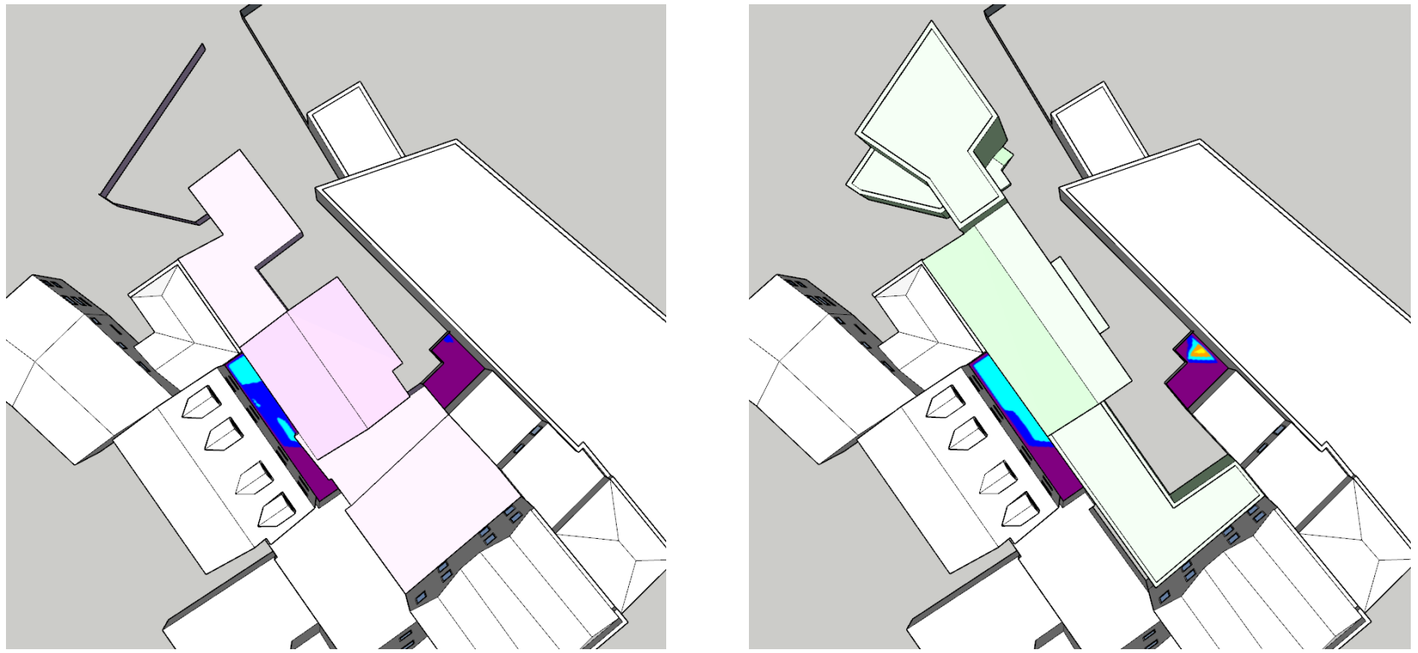


Figure 4.9 Shadow Plots for the Existing (Left) and Proposed (Right) Development Site and Adjacent Amenity Space

Property	Amenity Reference	Assessed Amenity Area (m^2)	Lit Area for > 2hours (%)		Change	Pass/Fail
			Existing	Proposed		
108 East Street	A1	17.9	0	2	+100%	Pass
Warden Court	A2	29.8	0	0	0%	Pass

Table 4.2: Results of the Lit Area in Adjacent amenity spaces with Existing and Proposed Development