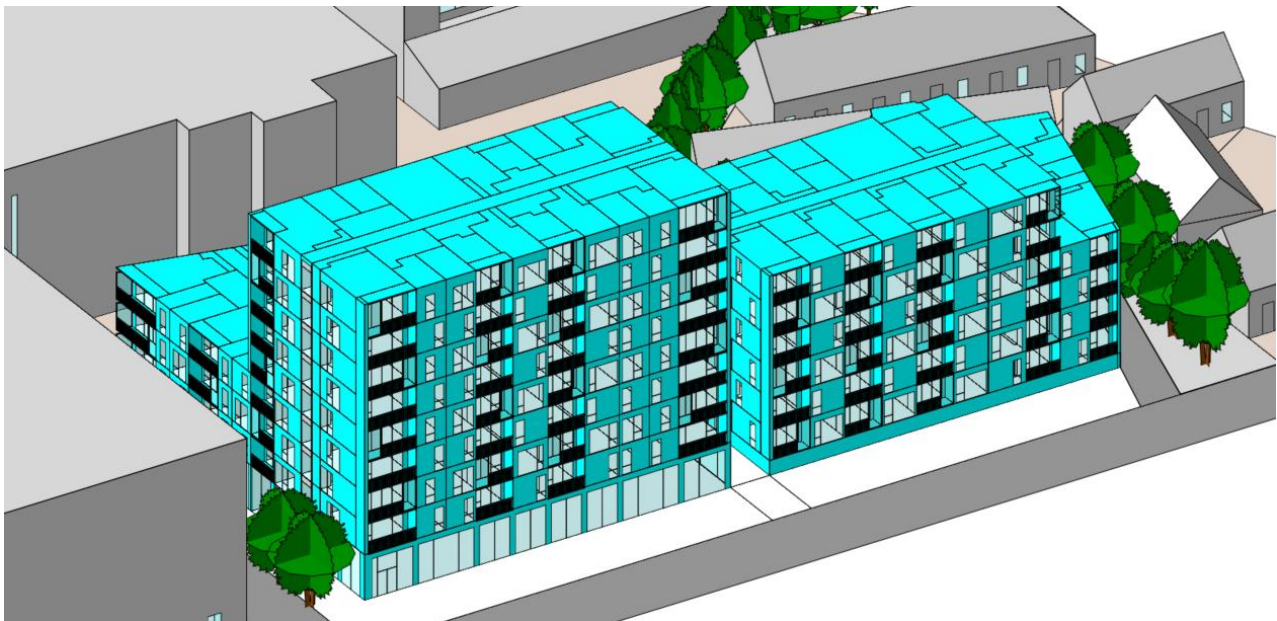


Project: Redforge Road Blackpool, Residential Development

Report Title: Daylight, Sunlight and Overshadowing



Report By: Passive Dynamics Sustainability Consultants

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Client: Bellmount Developments Limited

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
1. INTRODUCTION.....	6
2. DEFINITIONS.....	7
3. GUIDANCE DOCUMENTS REFERENCED DURING THIS STUDY	8
4. SIMULATION MODEL IMAGES	9
5. SIMULATION SOFTWARE DESCRIPTION	11
6. ASSESSMENT METHODOLOGY	12
7. VSC RESULTS	19
8. AVERAGE DAYLIGHT FACTOR RESULTS – PROPOSED SCHEME	21
9. SUNLIGHT RESULTS	40
10. SUMMARY CONCLUSION.....	51
APPENDIX A OVERSHADOWING IMAGES	53
APPENDIX B VERTICAL SKY COMPONENT RESULTS (PROPOSED DEVELOPMENT)	62

EXECUTIVE SUMMARY

Assessment Type	Results Summary
<p>Impact of loss of daylight to neighbouring properties</p>	<p>The Vertical Sky Component (VSC) Analysis is covered in <i>Section 7</i> of this report. The results are as follows;</p> <p>A simulation was run to quantify any reduction in VSC of the surrounding buildings resulting from the proposed development massing. Where the VSC is greater than 27% reasonable daylighting levels are available according to the BRE Industry standard. Where the VSC is found to be less than 27% but the comparison between the “before and after scenarios” is less than a 20% reduction, daylighting is unlikely to be significantly affected / noticed.</p> <p>Our simulation study outlines the effect that the proposed development has on the windows of its surrounding buildings. While the VSC has been reduced in certain areas of the surrounding buildings according to the BRE 209 Guidance Document, the majority of windows assessed meet the criteria outlined in the BRE Guidance Document for Vertical Sky Component. It should also be noted that some of the areas that experience a reduction in VSC are not currently habitable buildings (surrounding blocks 3, 4 and 5 – currently derelict houses). The openings of these unoccupied buildings were included in this assessment for information in the event that these sites are redeveloped and occupied in the future. However, the impact of the proposed development on these buildings is currently not relevant as they are inhabitable.</p> <p>Of the occupied blocks assessed (surrounding blocks 1 and 2), 75% of the openings meet the VSC criteria outlined in the BRE Guidance. It should be noted that of the 4 windows that do not meet the criteria, 2 of these windows are only marginally outside the maximum VSC reduction of 20%.</p> <p>As a result of this analysis, it is our understanding that any level of substantial development to this site would have a similar impact on the VSC experienced in surrounding blocks 1 and 2 due to their relative heights and proximity to the site.</p> <p>This conclusion is in line with the note below, taken from the BRE 209 Guidance Document:</p>

	<p>1.6 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 (see Section 5). 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. Alternatively, where natural light is of special</p> <p>Consideration should be given to the fact that the comparison being made is between an under-utilised existing site and the proposed development, which is inevitably going to have some form of an impact given the circumstances. The planning authority should consider applying flexibility with regard to BRE standards to balance the objective of achieving urban regeneration with any potential impacts.</p>
<p>Average Daylight Factor within the proposed apartments</p>	<p>Average Daylight Factor results are covered in detail in <i>Section 8</i> of this report. A summary of the results can be seen below.</p> <p>Minimum recommended Average Daylight Factors (ADF) are:</p> <ul style="list-style-type: none"> • Bedrooms - 1.00 % • Living Rooms – 2.00 % <p>Calculated ADF results are as follows:</p> <ul style="list-style-type: none"> • 99.33% of Bedrooms achieve an ADF of $\geq 1.00\%$ • 90.35% of the Living rooms achieve an ADF of $\geq 2.00\%$ <p>The calculated ADF results for each space assessed are presented in <i>Section 8</i> of this report.</p>
<p>Sunlight availability within the amenity space</p>	<p>Sunlight availability results are covered in detail in <i>Section 9</i> of this report. Both the existing neighbouring amenity areas and existing surrounding buildings were analysed as part of this study along with the openings and amenity areas of the proposed development itself.</p>

	<p>BRE Guidelines recommend that for an amenity space to appear adequately sunlit throughout the year, <u>at least half of the amenity space should receive at least two hours of sunlight on the design day, March 21st.</u> If, as a result of a new development, an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on March 21st is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable.</p> <p>The analysis confirms that the amenity areas of the proposed and surrounding buildings achieve upward of 2 hours of sunlight on the design day (21st March) over at least half of their areas. (See Section 9 of this report).</p> <p>The guidance document also states that rooms will appear reasonably sunlit provided:</p> <ul style="list-style-type: none"> – at least one main window wall faces within 90° of due south <i>and</i> – the centre of at least one window to a main living room can receive 25% of annual probably sunlight hours, including at least 5% of annual probably sunlight hours in the winter months between 21st September and 21st March. <ol style="list-style-type: none"> 1. The openings of the proposed building living spaces that face within 90° of due south largely receive at least 25% of annual probable sunlight hours and at least 5% of annual probable sunlight hours during winter months. 2. The openings of the surrounding building living spaces that face within 90° of due south largely receive at least 25% of annual probable sunlight hours and at least 5% of annual probable sunlight hours during winter months. <p>This information is presented in detail in Section 9 of this report.</p>
<p>Overshadowing Analysis</p>	<p>March 21st No overshadowing of neighbouring properties caused.</p> <p>June 21st No overshadowing of neighbouring properties caused.</p> <p>December 21st No overshadowing of neighbouring properties caused.</p> <p>See Appendix A for Overshadowing Images.</p>

1. INTRODUCTION

Passive Dynamics Sustainability Consultants has prepared this Daylight, Sunlight and Overshadowing report for and on behalf of Bellmount Developments Limited to accompany the planning application for the proposed Residential Development at Redforge Road, Blackpool, Cork. The scope of the assessment was to determine the following:

- Impact of loss of daylight to neighbouring properties
- Average Daylight Factor within the proposed apartments
- Sunlight availability within the proposed amenity space and neighbouring gardens
- Overshadowing analysis and impact to neighbouring properties

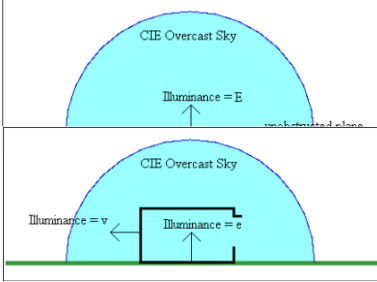
Daylight and Sunlight calculations have been carried out in accordance with BRE's 'Site Layout Planning for Sunlight and Daylight: A Guide to Good Practice' (2011) (herein referred to as the "BRE Guide") by P J Littlefair, which is accepted as good practice by Planning Authorities. The Design Standards for New Apartments - Guidelines for Planning Authorities (March 2018) were also considered as part of this study.

The BRE Guide gives advice on site layout to achieve provision of daylight and sunlight both within buildings, and in the open spaces between them. In general, it aims to aid designers in considering the relationship between new and existing buildings to ensure that each retains the potential to achieve good daylighting and sunlight levels.

The BRE Guide states in the introduction 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. 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". **It is therefore important that the guidelines that exist in relation to daylight and sunlight are read in the correct context and are not viewed as mandatory requirements.**

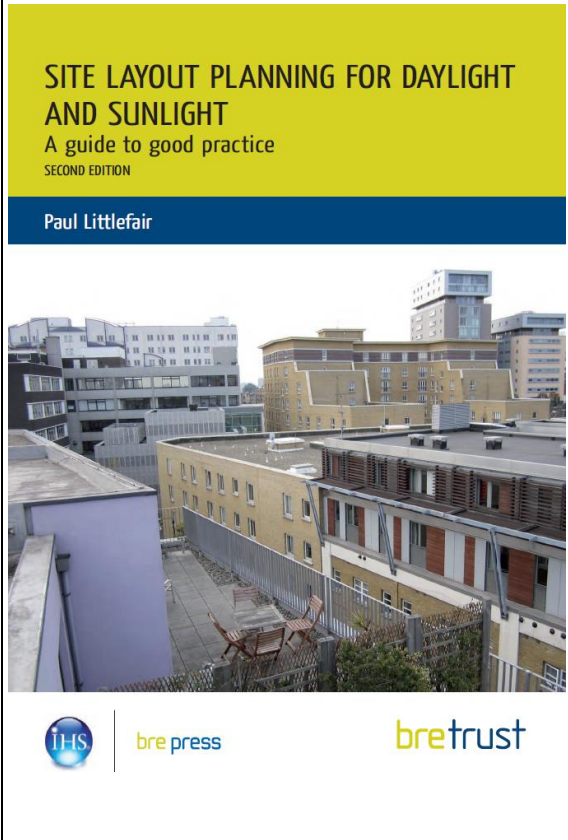

2. DEFINITIONS

The technical definitions that are referred to in this report are explained below.

BRE	Building Research Establishment.
Vertical Sky Component (VSC)	<p>The Vertical Sky Component (VSC) is the “Ratio of that part of illuminance, at a point on a given vertical plane that is received directly from a CIE standard overcast sky, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the “given vertical plane” is the outside of a window wall. The VSC does not include reflected light, either from the ground or from other buildings.</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>E= illuminance on an unobstructed plane.</p> <p>e= illuminance at point in interior</p> <p>Sky Component = e/E (often expressed as a percentage)</p> <p>Vertical Sky Component = v/E</p> </div> </div>
CIE Standard Overcast Sky	<p>A completely overcast sky for which the ratio of its luminance L_y at an angle of elevation y above the horizontal to the luminance L_z at the zenith is given by:</p> $L_y = L_z \frac{(1 + 2 \sin y)}{3}$ <p>The CIE standard overcast sky is darkest at the horizon and brightest at the zenith (vertically overhead).</p>
Average Daylight Factor (ADF)	<p>The ratio of total daylight flux incident on a reference area to total area of reference area, expressed as a percentage of outdoor illuminance on a horizontal plane due to an unobstructed hemisphere of sky of assumed or known luminance distribution. Thus a 1% ADF would mean that the average indoor illuminance would be one hundredth the outdoor unobstructed illuminance.</p>

3. GUIDANCE DOCUMENTS REFERENCED DURING THIS STUDY

This Daylight, Sunlight and Overshadowing Assessment has been carried out in accordance with the following best practice standard as outlined by the BRE and cross referenced by the Department of Housing, Planning and Local Government.

 <p>SITE LAYOUT PLANNING FOR DAYLIGHT AND SUNLIGHT A guide to good practice SECOND EDITION Paul Littlefair</p> <p>IHS bre press bretrust</p>	<p>This document gives advice on site layout planning to achieve good sun lighting and daylighting, both within buildings and in the open spaces between them. This authoritative document is widely used to provide advice during the planning and design stages of building development in the UK and Ireland.</p> <p>Guidance is given on site layout for good sun lighting and daylighting; safeguarding of daylight and sunlight within existing buildings nearby; and the protection of daylighting of adjoining land for future development.</p>
 <p>28</p> <p>An Roinn Tithíochta, Pleanála agus Riarádas Áitiúla Department of Housing, Planning and Local Government</p> <p>Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities</p>	<p>Design Standards for New Apartments - Guidelines for Planning Authorities (March 2018). This document outlines the design guides that should be used to assess daylight provision for new apartments.</p> <p>6.6 Planning authorities should have regard to quantitative performance approaches to daylight provision outlined in guides like the BRE guide 'Site Layout Planning for Daylight and Sunlight' (2nd edition) or BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting' when undertaken by development proposers which offer the capability to satisfy minimum standards of daylight provision.</p>

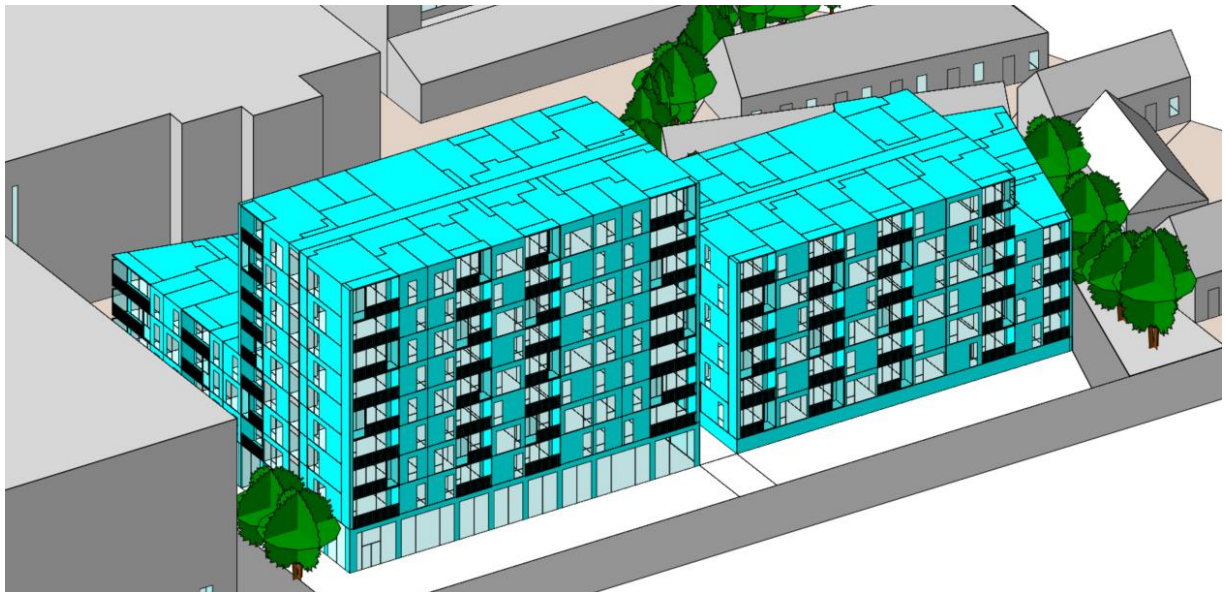
It is noted that BS 8206-2:2008: Lighting for buildings - Part 2: Code of practice for daylighting was recently replaced with BS EN 17037:2018 Daylight in Buildings. However, given that the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities refer to the BS 8206-2:2008 and not to BS EN 17037:2018, BS 8206:2008 has been referenced in the preparation of this report.

4. SIMULATION MODEL IMAGES

The following images show the simulation model that was constructed to analyse the daylight, sunlight and overshadowing performance for this proposed scheme.



Above: Simulation model image of the proposed development from the South West.



Above: Simulation model image of the proposed development from the South East.



Above: Simulation model image of the proposed development from the North West.



Above: Simulation model image of the proposed development from the North East.

5. SIMULATION SOFTWARE DESCRIPTION

IES VIRTUAL ENVIRONMENT

IES Virtual Environment is the world's leading building performance analysis tool. The software provides an in-depth suite of integrated analysis tools which allow an integrated design approach and highly detailed results.

IES VIRTUAL ENVIRONMENT - RADIANCE

Radiance is a software package developed by the Lighting Systems Research group at the Lawrence Berkeley Laboratory in California, USA. Radiance was developed as a research tool for predicting the distribution of visible radiation in illuminated spaces.

IES VIRTUAL ENVIRONMENT - SUNCAST

SunCast enables engineers to perform shading and solar insolation analysis studies and can generate images and animations. SunCast generates shadows and internal solar insolation from any sun position defined by date, time, orientation, site latitude and longitude. SunCast can be used at any stage of the design process from a model created by the IES Model Builder.

6. ASSESSMENT METHODOLOGY

DAYLIGHT ASSESSMENT – NEIGHBOURING PROPERTIES

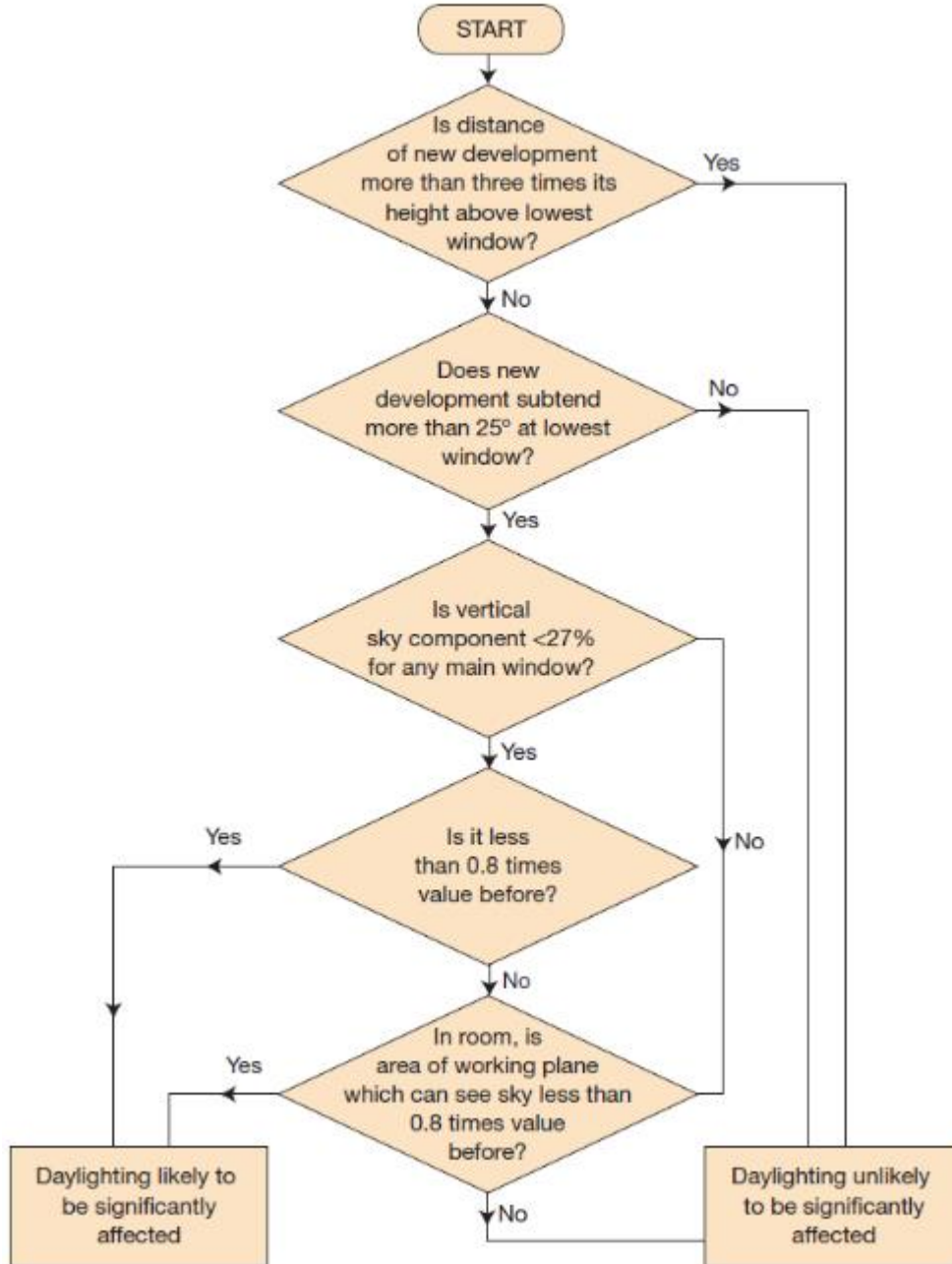
The guidelines given within the BRE Guide are intended for use for rooms in adjoining dwellings where daylight is required, including living rooms, kitchens, and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed. The guidelines may also be applied to any existing non-domestic buildings where the occupants have a reasonable expectation of daylight; this would include schools, hospitals, hotels and hostels, small workshops, and some offices. In our view, the neighbouring non-domestic buildings that surround the proposed site are mainly retail, therefore the occupants of these buildings would not have an expectation to receive high daylight levels. The surrounding residential buildings are numbered below so that they could be easily referenced during the analysis with the proposed development highlighted in pink.



It should be noted that Surrounding Blocks 3, 4 and 5 (numbered above) are not occupied and are currently derelict. The openings of these unoccupied buildings were included in this assessment for information in the event that these sites are redeveloped and occupied in the future. However, the impact of the proposed development on these buildings is currently not relevant as they are inhabitable.

To analyse the effects of the proposed development on the adjacent applicable buildings in the immediate surrounding area, a Vertical Sky Component (VSC) simulation was carried out using the IES Radiance software package. For the VSC definition refer to Section 2.0 of this report (page 7). The VSC was calculated with the proposed development in place using a simulation model. In accordance with Section 2.2 of the BRE Guide, where a VSC of 27% or greater is achieved, “enough skylight should still be reaching the existing building” and therefore daylighting will not be significantly affected. The BRE Methodology is summarised on page 14. Where a VSC less than 27% is achieved, further analysis is required to determine the likely daylight levels that will be achieved in affected spaces. Any reductions in VSC should be limited to 20%.

Methodology (as referenced in Section 2.2 of the BRE Guide)



Above: Decision chart / methodology used to quantify the impact of a new development on daylight levels of nearby buildings / dwellings.

DAYLIGHT ASSESSMENT – PROPOSED DEVELOPMENT

BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight states the following with respect to Average Daylight Factors (ADF).

C4 If a predominantly daylit appearance is required, then the ADF should be 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary electric lighting is provided. There are additional recommendations for dwellings of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms. These additional recommendations are minimum values of ADF which should be attained even if a predominantly daylit appearance is not achievable.

Above: From BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight

Therefore, in line with this guidance, minimum recommended average daylight factors are:

- **Bedrooms – 1.00 %**
- **Living Rooms / Kitchen – 2.00 %**

The following assumptions have been applied in this study:

- Sky Conditions: Standard CIE overcast sky
- Time (24hr): 12:00
- Date: 21 September
- Working Plane: 0.85m

The following surface reflectance's were applied in this study:

Material Surface	Reflectance Value	Glass/Window Details
External Wall	0.82	-
Internal Partition	0.82	-
Roof (external)	0.20	-
Ground (external)	0.20	-
Floor/Ceiling (Floor)	0.40	-
Floor/Ceiling (Ceiling)	0.88	-
Glass Light transmittance	-	70% (standard glazing)
	-	72% (frosted glazing)
Window Frame Thickness	-	50 mm

SUNLIGHT ASSESSMENT – NEIGHBOURING AMENITY SPACE

BRE Guidelines recommend that in order for an amenity space to appear adequately sunlit throughout the year, at least half of the amenity space should receive at least two hours of sunlight on the design day, March 21st. If, as a result of a new development, an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on March 21st is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable.

Summary

3.3.17 It is recommended 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 21 March. If as a result of 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 0.8 times its former value, then the loss of sunlight 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.

Above: BRE Guidance in relation to protecting Sunlight in Gardens, Open Spaces and Amenity spaces.

The amount of sunlight available to surrounding amenity spaces (such as the gardens of adjacent buildings) is assessed as part of this analysis. The results are outlined in *Section 9* of this report.

SUNLIGHT ASSESSMENT – PROPOSED AND SURROUNDING BUILDINGS

According to the BRE guide, living spaces will appear reasonably sunlit if they receive 25% or more of their annual probable sunlight hours for the year, and 5% or more of their annual probable sunlight hours during the winter months. Analysis was carried out in line with BRE 209 guidance, ensuring that the proposed development receives adequate levels of sunlight and no substantial loss of sunlight is incurred in the surrounding buildings.

Summary (new buildings)

3.1.15 In general a dwelling, or non-domestic building which has a particular requirement for sunlight, will appear reasonably sunlit provided:

- at least one main window wall faces within 90° of due south and
- the centre of at least one window to a main living room can receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21 September and 21 March.

Above: BRE Guidance in relation to achieving adequate levels of sunlight in new buildings

Summary

3.2.11 If a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the sunlighting of the existing dwelling may be adversely affected. This will be the case if the centre of the window:

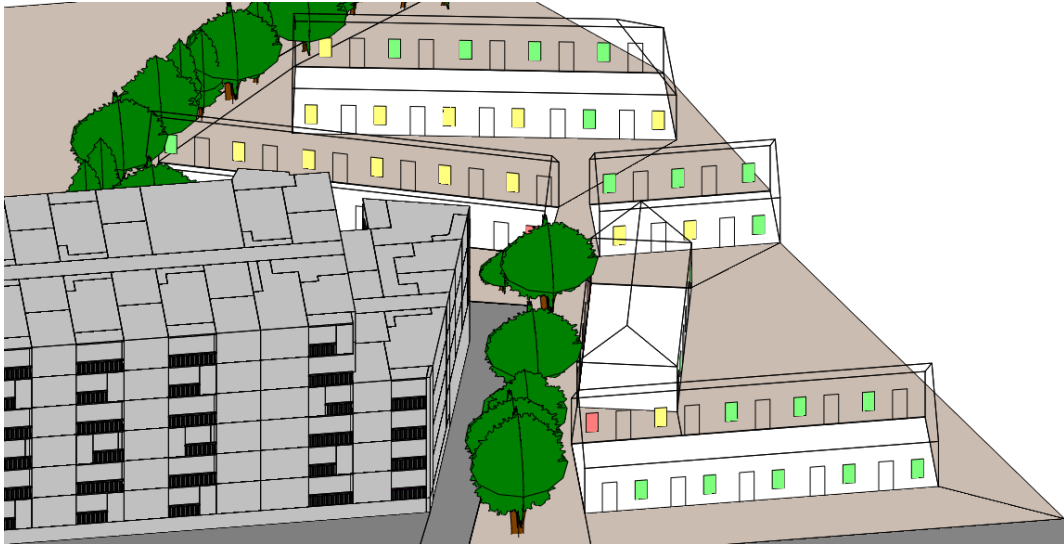
- receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between 21 September and 21 March and
- receives less than 0.8 times its former sunlight hours during either period and
- has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

Above: BRE Guidance in relation to maintaining adequate levels of sunlight in existing buildings

Results for this assessment are shown in *Section 9* of this report.

7. VSC RESULTS

For the BRE Guidance on Vertical Sky Component refer to pages 12, 13 and 14 of this report.



Above: Windows shown in green have achieved a VSC of $\geq 27\%$. If the VSC is greater than 27% then enough skylight should be reaching the window of the existing buildings. The windows in yellow achieve a VSC of less than 27% but the new VSC is greater than or equal to 80% of its initial value pre-development. The windows in red achieve a VSC of less than 27%.



Above: Windows shown in green have achieved a VSC of $\geq 27\%$. If the VSC is greater than 27% then enough skylight should be reaching the window of the existing buildings. The windows in yellow achieve a VSC of less than 27% but the new VSC is greater than or equal to 80% of its initial value pre-development. The windows in red achieve a VSC of less than 27%.

A full breakdown of the VSC results for each opening analysed can be found in Appendix B of this report.

As shown above (and tabulated in Appendix B) a number of the windows analysed do not meet the desired criteria as outlined in the BRE 209 Guidance Document. However, it should be noted that some of the areas that experience a reduction in VSC are not currently habitable buildings (surrounding blocks 3, 4 and 5 – currently derelict houses).

It is important to note that of the occupied blocks assessed (surrounding blocks 1 and 2), 75% of the openings meet the VSC criteria outlined in the BRE Guidance. It should also be noted that of the 4 windows that do not meet the criteria, 2 of these windows are only marginally outside the maximum VSC reduction of 20% (see *Appendix B*).

This minor impact to the VSC of surrounding buildings is to be expected for any substantial development in such an area due to these buildings' relative heights and proximity to the site.

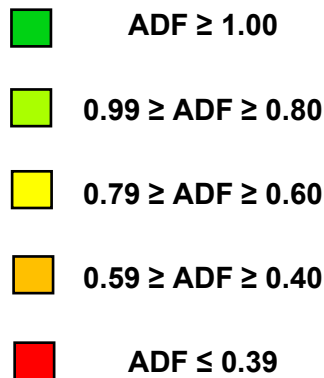
Consideration should be given to the fact that the comparison being made is between an existing, under-utilised site and the proposed development, which is inevitably going to have some form of an impact given the circumstances. Flexibility regarding BRE standards should be applied to balance the objective of achieving urban regeneration with any potential impacts.

8. AVERAGE DAYLIGHT FACTOR RESULTS – PROPOSED SCHEME

The calculated ADF results are summarised below:

- **99.33%** of Bedrooms achieve an ADF of $\geq 1.00\%$
- **90.35%** of the Living rooms achieve an ADF of $\geq 2.00\%$

The images below show the simulation model with **Bedrooms** colour coded based on their ADF performance.



Above: Legend



Above: Bedroom ADF results of the proposed development from the West.

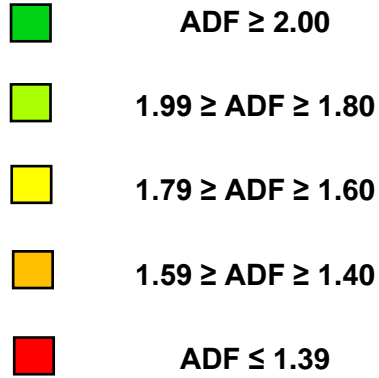


Above: Bedroom ADF results of the proposed development from the South.



Above: Bedroom ADF results of the proposed development from the South East.

The images below show the simulation model with **Living/Kitchen** spaces colour coded based on their ADF performance.



Above: Legend



Above: Kitchen/Living space ADF results of the proposed development from the South East.



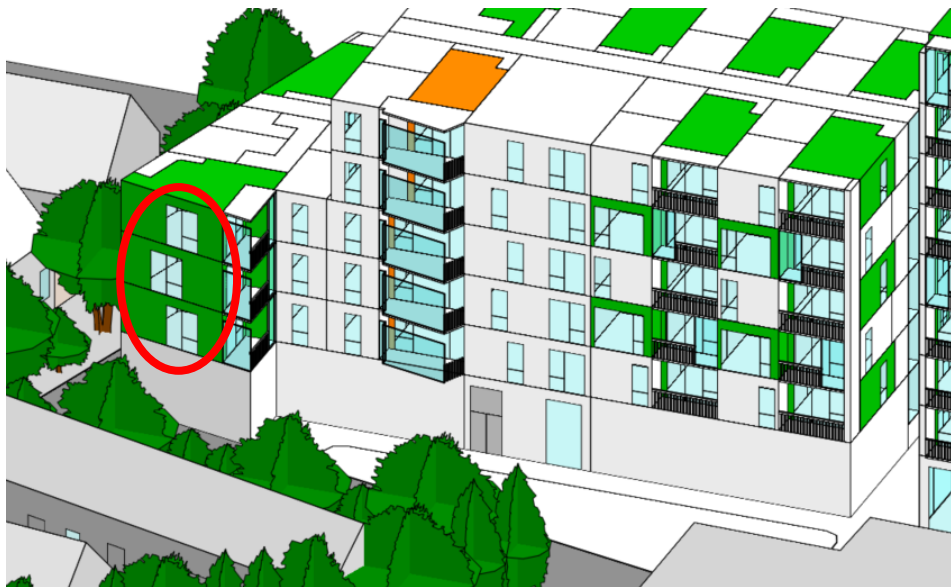
Above: Kitchen/Living space ADF results of the proposed development from the East.



Above: Kitchen/Living space ADF results of the proposed development from the West.



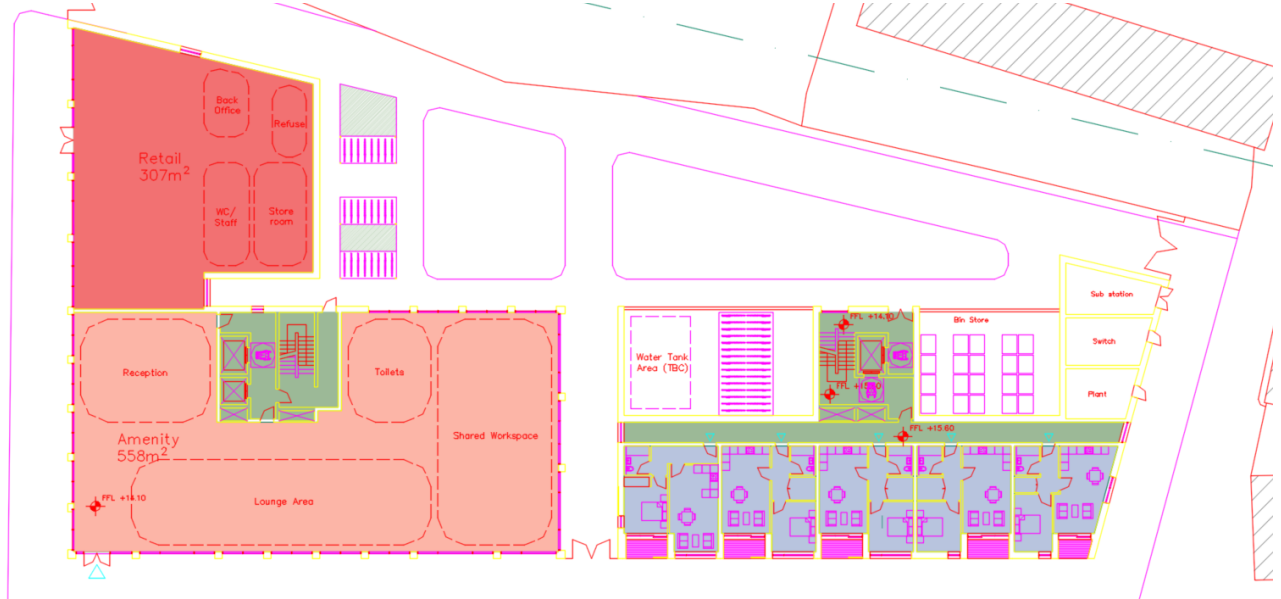
Above: Kitchen/Living space ADF results of the proposed development from the North.



Above: It should be noted that the kitchen/living spaces highlighted use a frosted glazing with a light transmittance of 72%. This was considered in the ADF calculation.

The results for each individual space tested are tabulated below.

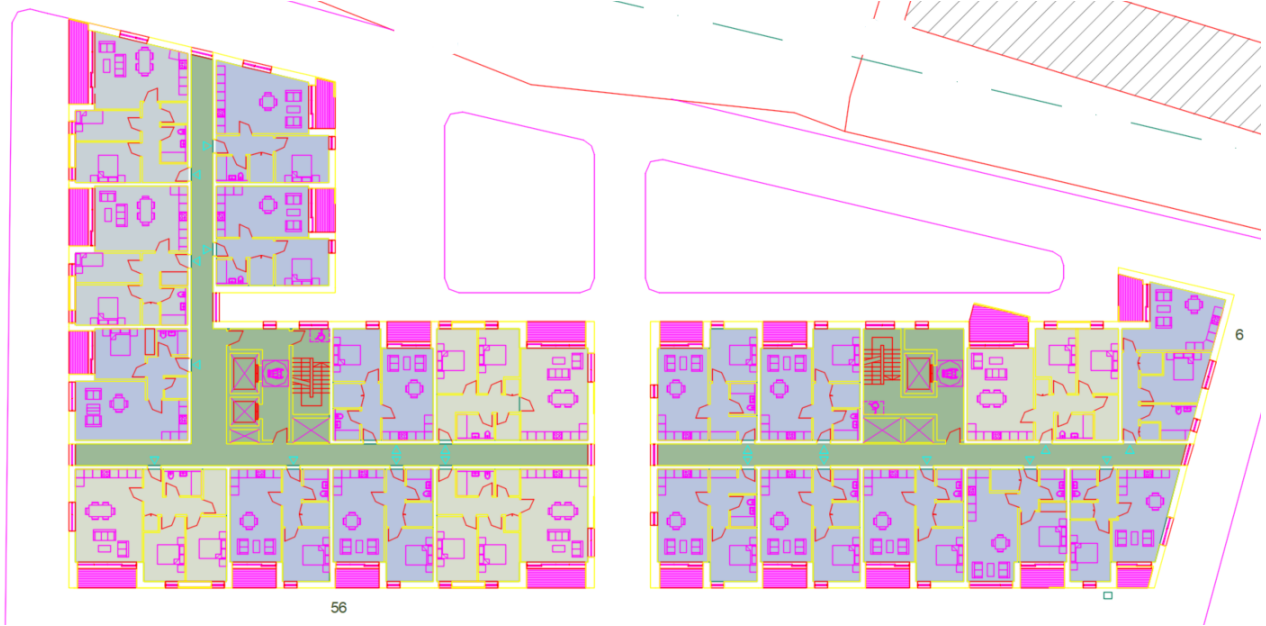
Ground Floor Plan



Ground Floor ADF Results

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
1	00_Apt 1 Bedroom 1	Bedroom	9.43	3.49	Yes
2	00_Apt 1 Living/Kitchen	Living	6.73	4.98	Yes
3	00_Apt 2 Living/Kitchen	Living	7.27	2.18	Yes
4	00_Apt 3 Bedroom 1	Bedroom	7.30	8.48	Yes
5	00_Apt 3 Living/Kitchen	Living	7.27	2.19	Yes
6	00_Apt 4 Bedroom 1	Bedroom	1.87	1.48	Yes
7	00_Apt 4 Living/Kitchen	Living	7.27	2.75	Yes
8	00_Apt 5 Bedroom 1	Bedroom	2.16	2.04	Yes
9	00_Apt 5 Living/Kitchen	Living	9.60	4.54	Yes
10	00_Apt 2 Bedroom 1	Bedroom	7.30	8.43	Yes

Level 01 Plan

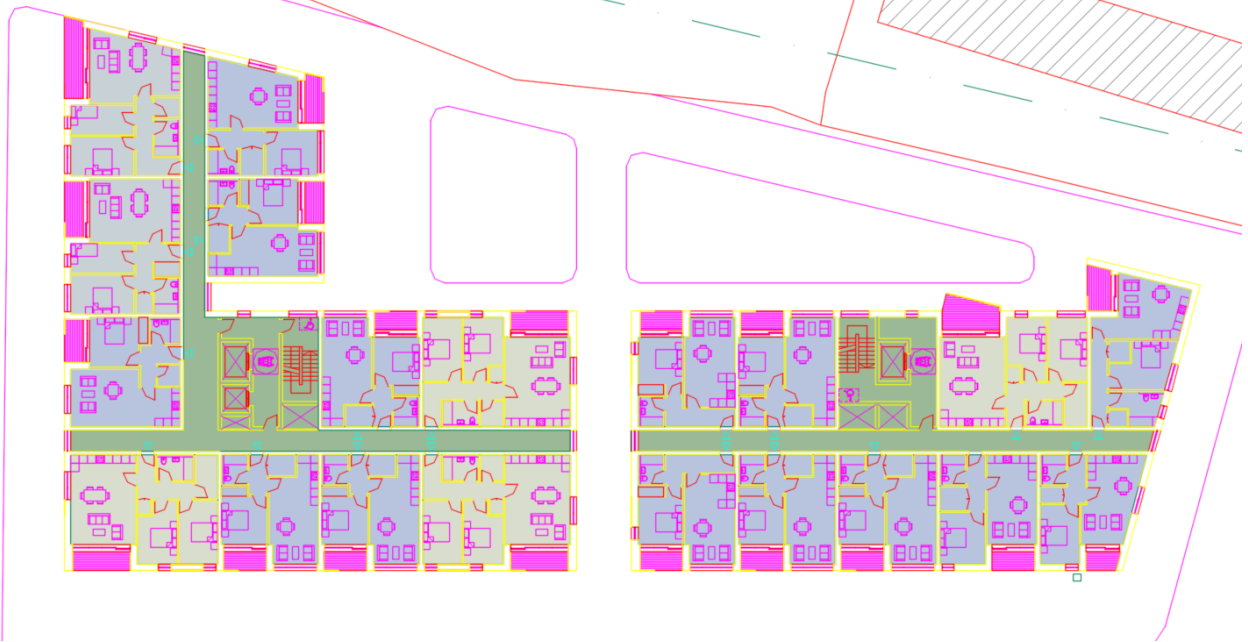


Level 01 ADF Results

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
1	01_Apt 1 Bedroom 1	Bedroom	2.16	1.37	Yes
2	01_Apt 1 Bedroom 2	Bedroom	2.16	1.03	Yes
3	01_Apt 1 Living/Kitchen	Living	16.69	3.93	Yes
4	01_Apt 2 Bedroom 1	Bedroom	2.16	1.32	Yes
5	01_Apt 2 Bedroom 2	Bedroom	2.16	0.99	No
6	01_Apt 2 Living/Kitchen	Living	9.98	1.72	No
7	01_Apt 3 Bedroom 1	Bedroom	7.27	1.93	Yes
8	01_Apt 4 Bedroom 1	Bedroom	2.16	1.99	Yes
9	01_Apt 4 Bedroom 2	Bedroom	2.16	1.68	Yes
10	01_Apt 4 Living/Kitchen	Living	7.40	2.44	Yes
11	01_Apt 4 Living/Kitchen	Living	14.78	4.62	Yes
12	01_Apt 5 Bedroom 1	Bedroom	2.16	1.74	Yes
13	01_Apt 5 Living/Kitchen	Living	7.27	2.67	Yes
14	01_Apt 6 Bedroom 1	Bedroom	2.16	1.78	Yes
15	01_Apt 6 Living/Kitchen	Living	7.27	2.67	Yes
16	01_Apt 7 Bedroom 1	Bedroom	2.16	1.71	Yes
17	01_Apt 7 Bedroom 2	Bedroom	2.16	2.00	Yes
18	01_Apt 7 Living/Kitchen	Living	14.78	3.67	Yes
19	01_Apt 8 Bedroom 1	Bedroom	2.16	1.82	Yes

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
20	01_Apt 8 Living/Kitchen	Living	9.4	2.86	Yes
21	01_Apt 9 Bedroom 1	Bedroom	2.16	1.83	Yes
22	01_Apt 9 Living/Kitchen	Living	7.27	2.67	Yes
23	01_Apt 10 Bedroom 1	Bedroom	2.16	1.78	Yes
24	01_Apt 10 Living/Kitchen	Living	7.27	2.68	Yes
25	01_Apt 11 Bedroom 1	Bedroom	7.27	2.91	Yes
26	01_Apt 11 Living/Kitchen	Living	7.30	4.80	Yes
27	01_Apt 12 Bedroom 1	Bedroom	2.16	1.89	Yes
28	01_Apt 12 Living/Kitchen	Living	9.60	4.68	Yes
29	01_Apt 13 Bedroom 1	Bedroom	4.80	4.15	Yes
30	01_Apt 13 Living/Kitchen	Living	10.58	4.02	Yes
31	01_Apt 14 Bedroom 1	Bedroom	2.16	1.98	Yes
32	01_Apt 14 Bedroom 2	Bedroom	2.16	1.47	Yes
33	01_Apt 14 Living/Kitchen	Living	9.98	1.55	No
34	01_Apt 15 Bedroom 1	Bedroom	2.16	1.49	Yes
35	01_Apt 15 Living/Kitchen	Living	7.27	2.39	Yes
36	01_Apt 16 Bedroom 1	Bedroom	2.16	1.56	Yes
37	01_Apt 16 Living/Kitchen	Living	9.43	2.57	Yes
38	01_Apt 17 Bedroom 1	Bedroom	2.16	1.75	Yes
39	01_Apt 17 Bedroom 2	Bedroom	2.16	1.31	Yes
40	01_Apt 17 Living/Kitchen	Living	14.78	3.41	Yes
41	01_Apt 18 Bedroom 1	Bedroom	2.16	1.28	Yes
42	01_Apt 18 Living/Kitchen	Living	7.27	2.03	Yes
43	01_Apt 19 Bedroom 1	Bedroom	2.16	1.42	Yes
44	01_Apt 19 Living/Kitchen	Living	7.37	1.55	No
45	01_Apt 20 Bedroom 1	Bedroom	2.12	1.46	Yes
46	01_Apt 20 Living/Kitchen	Living	12.17	3.35	Yes

Level 02 Plan

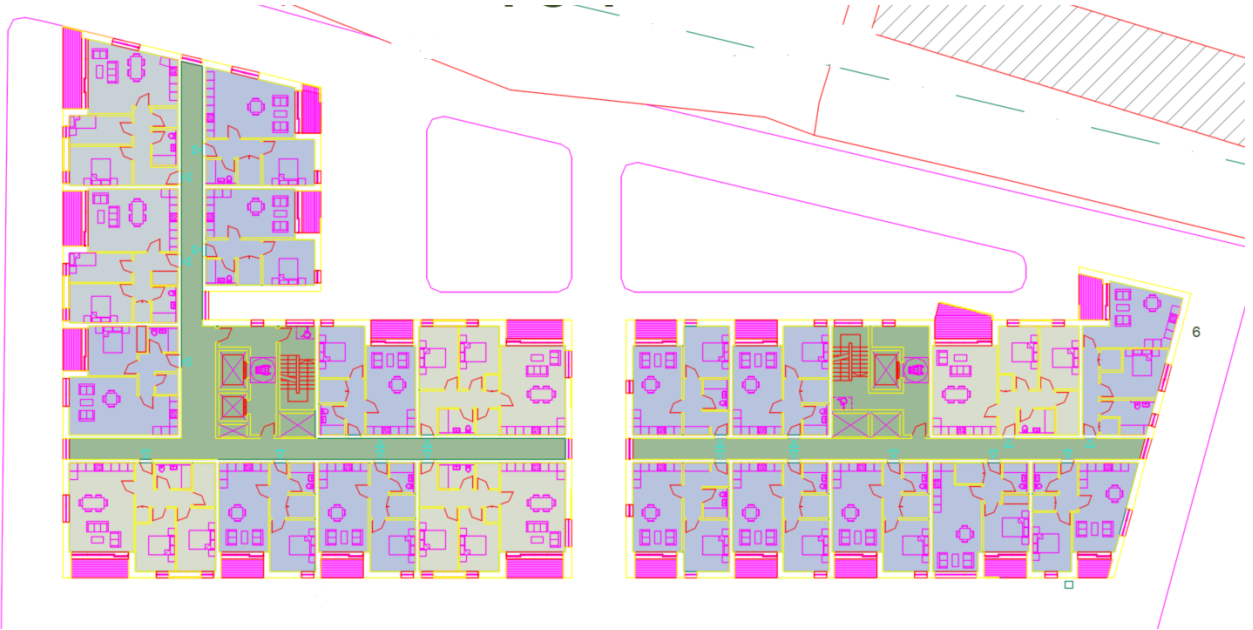


Level 02 ADF Results

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
1	02_Apt 1 Bedroom 1	Bedroom	2.16	1.45	Yes
2	02_Apt 1 Bedroom 2	Bedroom	4.80	3.40	Yes
3	02_Apt 1 Living/Kitchen	Living/Kitchen	16.69	4.10	Yes
4	02_Apt 2 Bedroom 1	Bedroom	2.16	1.40	Yes
5	02_Apt 2 Bedroom 2	Bedroom	4.80	2.73	Yes
6	02_Apt 2 Living/Kitchen	Living/Kitchen	9.98	1.54	No
7	02_Apt 3 Bedroom 1	Bedroom	7.27	1.64	Yes
8	02_Apt 4 Bedroom 1	Bedroom	2.16	2.34	Yes
9	02_Apt 4 Bedroom 2	Bedroom	4.80	4.61	Yes
10	02_Apt 4 Living/Kitchen	Living/Kitchen	14.64	3.98	Yes
11	02_Apt 4 Living/Kitchen	Living/Kitchen	4.80	1.69	No
12	02_Apt 5 Bedroom 1	Bedroom	7.27	3.07	Yes
13	02_Apt 5 Living/Kitchen	Living/Kitchen	6.06	3.34	Yes
14	02_Apt 6 Bedroom 1	Bedroom	6.98	3.24	Yes
15	02_Apt 6 Living/Kitchen	Living/Kitchen	6.70	3.73	Yes
16	02_Apt 7 Bedroom 1	Bedroom	4.80	4.51	Yes
17	02_Apt 7 Bedroom 2	Bedroom	2.16	2.36	Yes
18	02_Apt 7 Living/Kitchen	Living/Kitchen	14.78	3.18	Yes
19	02_Apt 8 Bedroom 1	Bedroom	9.43	3.34	Yes
20	02_Apt 8 Living/Kitchen	Living/Kitchen	6.67	4.12	Yes
21	02_Apt 9 Bedroom 1	Bedroom	7.27	3.08	Yes

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
22	02_Apt 9 Living/Kitchen	Living/Kitchen	6.68	3.81	Yes
23	02_Apt 10 Bedroom 1	Bedroom	7.27	3.09	Yes
24	02_Apt 10 Living/Kitchen	Living/Kitchen	6.66	3.43	Yes
25	02_Apt 11 Bedroom 1	Bedroom	2.16	1.92	Yes
26	02_Apt 11 Living/Kitchen	Living/Kitchen	7.27	2.58	Yes
27	02_Apt 12 Bedroom 1	Bedroom	2.16	1.78	Yes
28	02_Apt 12 Living/Kitchen	Living/Kitchen	9.60	4.87	Yes
29	02_Apt 13 Bedroom 1	Bedroom	4.80	4.57	Yes
30	02_Apt 13 Living/Kitchen	Living/Kitchen	10.58	4.25	Yes
31	02_Apt 14 Bedroom 1	Bedroom	2.16	1.93	Yes
32	02_Apt 14 Bedroom 2	Bedroom	2.16	1.45	Yes
33	02_Apt 14 Living/Kitchen	Living/Kitchen	9.98	1.53	No
34	02_Apt 15 Bedroom 1	Bedroom	7.27	2.75	Yes
35	02_Apt 15 Living/Kitchen	Living/Kitchen	6.68	3.45	Yes
36	02_Apt 16 Bedroom 1	Bedroom	9.28	2.98	Yes
37	02_Apt 16 Living/Kitchen	Living/Kitchen	6.67	3.97	Yes
38	02_Apt 17 Bedroom 1	Bedroom	2.16	2.00	Yes
39	02_Apt 17 Bedroom 2	Bedroom	4.80	3.63	Yes
40	02_Apt 17 Living/Kitchen	Living/Kitchen	14.78	3.13	Yes
41	02_Apt 18 Bedroom 1	Bedroom	7.27	2.36	Yes
42	02_Apt 18 Living/Kitchen	Living/Kitchen	6.64	2.4	Yes
43	02_Apt 19 Bedroom 1	Bedroom	7.23	5.51	Yes
44	02_Apt 19 Living/Kitchen	Living/Kitchen	7.08	2.13	Yes
45	02_Apt 20 Bedroom 1	Bedroom	7.40	6.68	Yes
46	02_Apt 20 Living/Kitchen	Living/Kitchen	11.88	4.17	Yes

Level 03 Plan

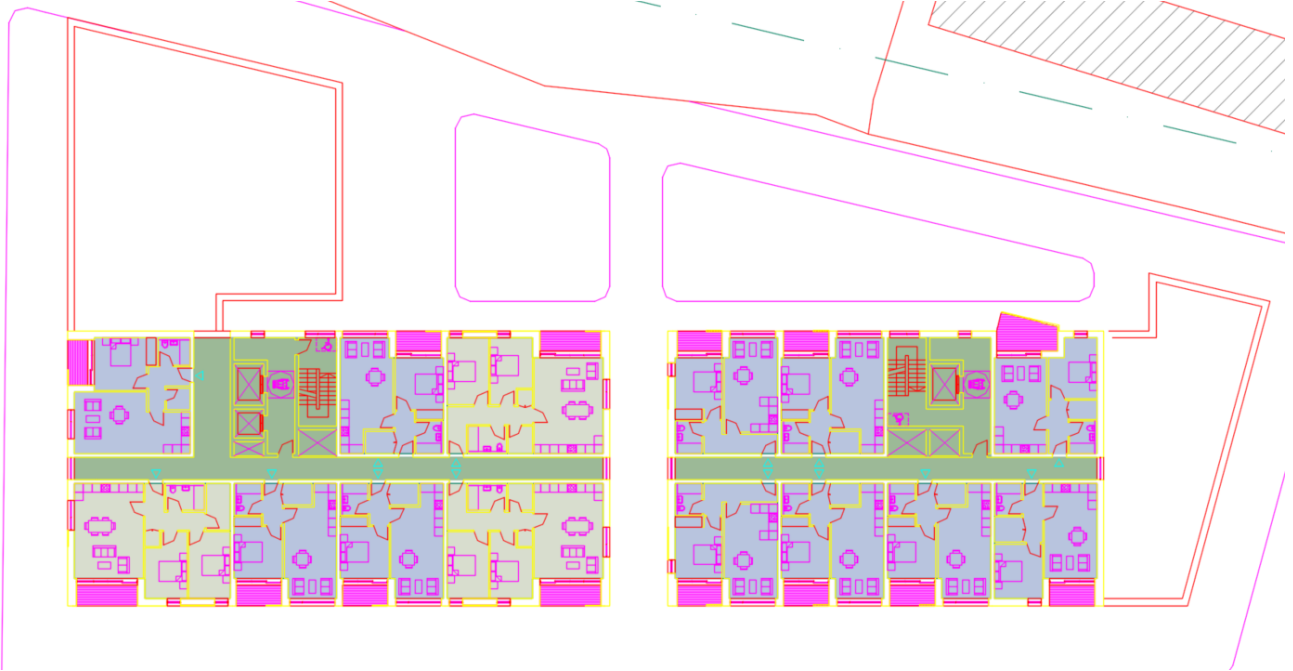


Level 03 ADF Results

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
1	03_Apt 1 Bedroom 1	Bedroom	2.16	1.70	Yes
2	03_Apt 1 Bedroom 2	Bedroom	2.16	1.29	Yes
3	03_Apt 1 Living/Kitchen	Living	16.69	5.12	Yes
4	03_Apt 2 Bedroom 1	Bedroom	2.16	1.67	Yes
5	03_Apt 2 Bedroom 2	Bedroom	2.16	1.24	Yes
6	03_Apt 2 Living/Kitchen	Living	9.98	2.21	Yes
7	03_Apt 3 Bedroom 1	Bedroom	7.27	2.47	Yes
8	03_Apt 4 Bedroom 1	Bedroom	2.16	2.10	Yes
9	03_Apt 4 Bedroom 2	Bedroom	2.16	1.66	Yes
10	03_Apt 4 Living/Kitchen	Living	4.80	1.74	No
11	03_Apt 4 Living/Kitchen	Living	14.78	4.94	Yes
12	03_Apt 5 Bedroom 1	Bedroom	2.16	1.99	Yes
13	03_Apt 5 Living/Kitchen	Living	7.27	2.72	Yes
14	03_Apt 6 Bedroom 1	Bedroom	2.16	1.79	Yes
15	03_Apt 6 Living/Kitchen	Living	7.27	2.72	Yes
16	03_Apt 7 Bedroom 1	Bedroom	2.16	1.68	Yes
17	03_Apt 7 Bedroom 2	Bedroom	2.16	2.06	Yes
18	03_Apt 7 Living/Kitchen	Living	14.78	3.81	Yes
19	03_Apt 8 Bedroom 1	Bedroom	2.16	1.67	Yes
20	03_Apt 8 Living/Kitchen	Living	9.43	3.01	Yes
21	03_Apt 9 Bedroom 1	Bedroom	2.16	1.66	Yes

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
22	03_Apt 9 Living/Kitchen	Living	7.27	2.73	Yes
23	03_Apt 10 Bedroom 1	Bedroom	2.16	1.89	Yes
24	03_Apt 10 Living/Kitchen	Living	7.27	2.72	Yes
25	03_Apt 11 Bedroom 1	Bedroom	7.27	2.89	Yes
26	03_Apt 11 Living/Kitchen	Living	7.30	4.37	Yes
27	03_Apt 12 Living/Kitchen	Living	9.60	4.93	Yes
28	03_Apt 13 Bedroom 1	Bedroom	4.80	4.53	Yes
29	03_Apt 13 Living/Kitchen	Living	10.58	4.17	Yes
30	03_Apt 14 Bedroom 1	Bedroom	2.16	2.00	Yes
31	03_Apt 14 Bedroom 2	Bedroom	2.16	1.58	Yes
32	03_Apt 14 Living/Kitchen	Living	9.98	1.58	No
33	03_Apt 15 Bedroom 1	Bedroom	2.16	1.62	Yes
34	03_Apt 15 Living/Kitchen	Living	7.27	2.56	Yes
35	03_Apt 16 Bedroom 1	Bedroom	2.16	1.48	Yes
36	03_Apt 16 Living/Kitchen	Living	9.43	2.86	Yes
37	03_Apt 17 Bedroom 1	Bedroom	2.16	1.86	Yes
38	03_Apt 17 Bedroom 2	Bedroom	2.16	1.48	Yes
39	03_Apt 17 Living/Kitchen	Living	14.78	3.85	Yes
40	03_Apt 18 Bedroom 1	Bedroom	2.16	1.31	Yes
41	03_Apt 18 Living/Kitchen	Living	7.27	2.47	Yes
42	03_Apt 19 Bedroom 1	Bedroom	1.95	1.01	Yes
43	03_Apt 19 Living/Kitchen	Living	7.37	1.87	No
44	03_Apt 20 Bedroom 1	Bedroom	2.16	1.33	Yes
45	03_Apt 20 Living/Kitchen	Living	12.17	4.24	Yes

Level 04 Plan

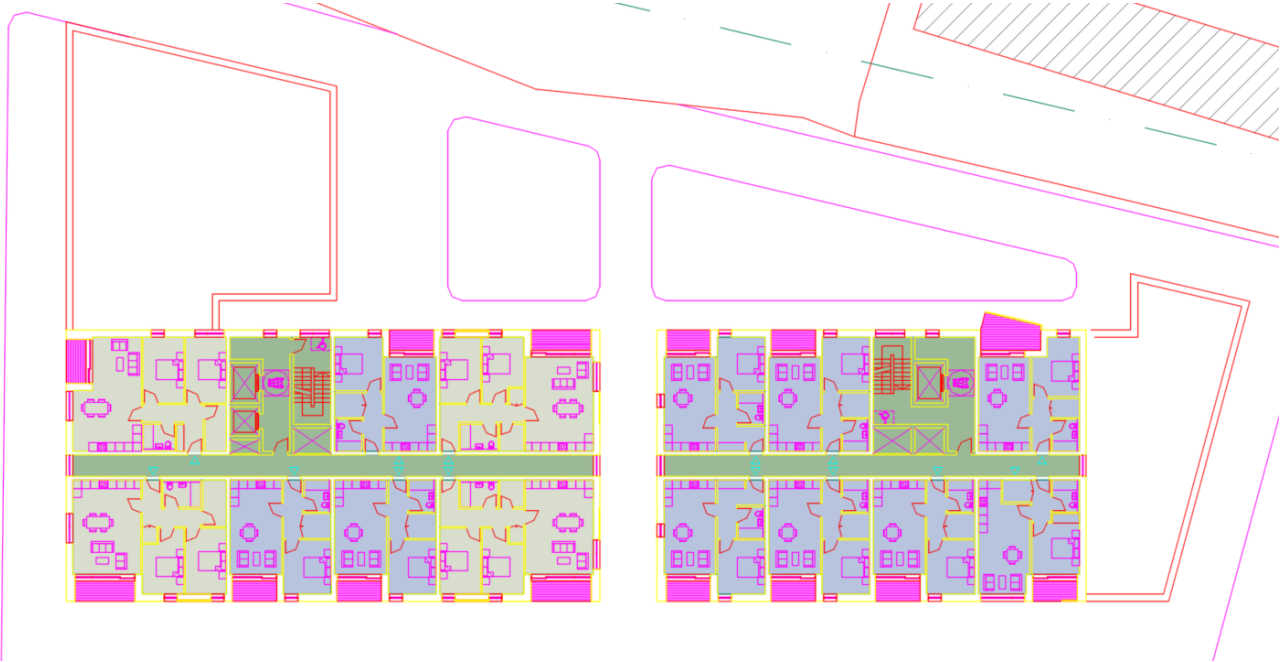


Level 04 ADF Results

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
1	04_Apt 1 Bedroom 1	Bedroom	2.16	2.18	Yes
2	04_Apt 1 Bedroom 2	Bedroom	4.80	4.16	Yes
3	04_Apt 1 Living/Kitchen	Living	14.64	4.34	Yes
4	04_Apt 2 Bedroom 1	Bedroom	7.27	2.91	Yes
5	04_Apt 2 Living/Kitchen	Living	6.06	3.57	Yes
6	04_Apt 3 Bedroom 1	Bedroom	6.98	3.00	Yes
7	04_Apt 3 Living/Kitchen	Living	6.76	4.18	Yes
8	04_Apt 4 Bedroom 1	Bedroom	4.80	4.20	Yes
9	04_Apt 4 Bedroom 2	Bedroom	2.16	2.12	Yes
10	04_Apt 4 Living/Kitchen	Living	14.78	3.53	Yes
11	04_Apt 5 Bedroom 1	Bedroom	7.27	2.47	Yes
12	04_Apt 5 Living/Kitchen	Living	4.80	2.41	Yes
13	04_Apt 6 Bedroom 1	Bedroom	7.27	3.07	Yes
14	04_Apt 6 Living/Kitchen	Living	6.71	3.98	Yes
15	04_Apt 7 Bedroom 1	Bedroom	2.16	2.30	Yes
16	04_Apt 7 Bedroom 2	Bedroom	4.80	4.53	Yes
17	04_Apt 7 Living/Kitchen	Living	14.78	3.76	Yes
18	04_Apt 8 Bedroom 1	Bedroom	9.43	3.47	Yes
19	04_Apt 8 Living/Kitchen	Living	6.73	4.63	Yes
20	04_Apt 9 Bedroom 1	Bedroom	7.27	2.96	Yes

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
21	04_Apt 9 Living/Kitchen	Living	6.68	3.99	Yes
22	04_Apt 10 Bedroom 1	Bedroom	7.27	2.94	Yes
23	04_Apt 10 Living/Kitchen	Living	6.66	4.10	Yes
24	04_Apt 11 Bedroom 1	Bedroom	1.87	1.22	Yes
25	04_Apt 11 Living/Kitchen	Living	12.07	5.52	Yes
26	04_Apt 12 Bedroom 1	Bedroom	6.96	6.30	Yes
27	04_Apt 12 Living/Kitchen	Living	7.27	1.49	No
28	04_Apt 13 Bedroom 1	Bedroom	7.27	3.00	Yes
29	04_Apt 13 Living/Kitchen	Living	6.68	4.01	Yes
30	04_Apt 14 Bedroom 1	Bedroom	9.28	3.47	Yes
31	04_Apt 14 Living/Kitchen	Living	6.73	4.30	Yes

Level 05 Plan

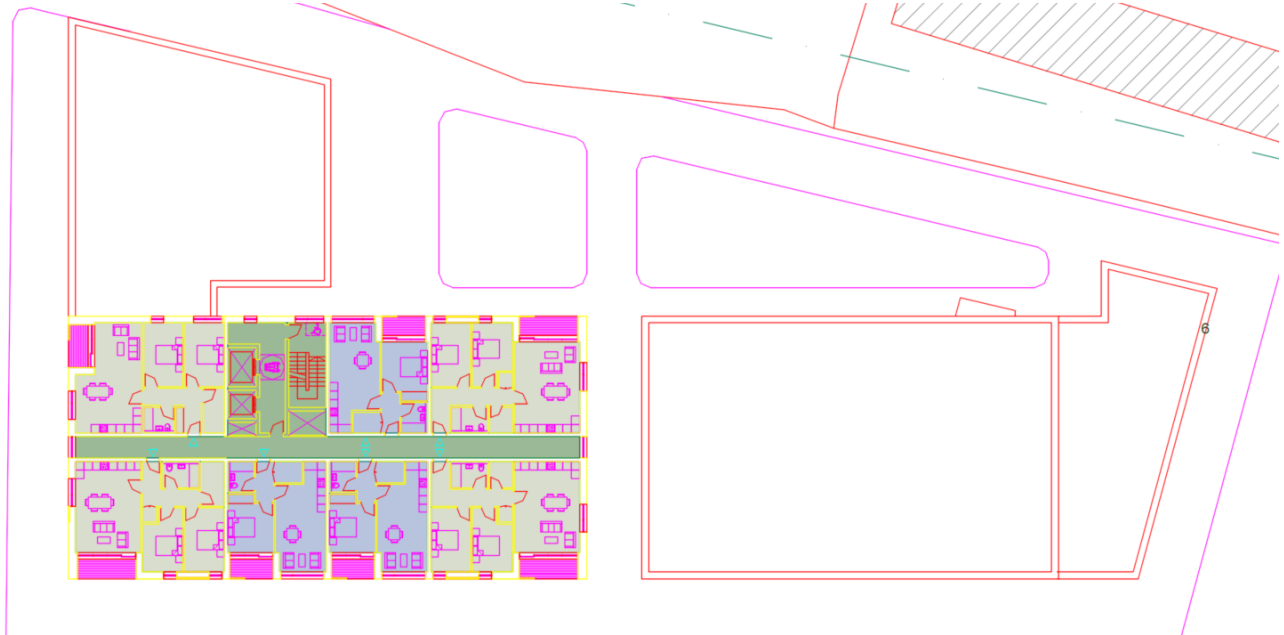


Level 05 ADF Results

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
1	05_Apt 1 Bedroom 1	Bedroom	2.16	2.08	Yes
2	05_Apt 1 Bedroom 2	Bedroom	2.16	1.67	Yes
3	05_Apt 1 Living/Kitchen	Living	14.78	5.46	Yes
4	05_Apt 2 Bedroom 1	Bedroom	2.16	1.65	Yes
5	05_Apt 2 Living/Kitchen	Living	7.27	2.72	Yes
6	05_Apt 3 Bedroom 1	Bedroom	2.16	1.89	Yes
7	05_Apt 3 Living/Kitchen	Living	7.27	2.72	Yes
8	05_Apt 4 Bedroom 1	Bedroom	2.16	1.68	Yes
9	05_Apt 4 Bedroom 2	Bedroom	2.16	2.07	Yes
10	05_Apt 4 Living/Kitchen	Living	14.78	4.76	Yes
11	05_Apt 5 Bedroom 1	Bedroom	2.16	1.70	Yes
12	05_Apt 5 Bedroom 2	Bedroom	2.16	1.73	Yes
13	05_Apt 5 Living/Kitchen	Living	16.20	5.46	Yes
14	05_Apt 6 Bedroom 1	Bedroom	2.16	1.53	Yes
15	05_Apt 6 Living/Kitchen	Living	7.27	2.67	Yes
16	05_Apt 7 Bedroom 1	Bedroom	2.16	1.94	Yes
17	05_Apt 7 Bedroom 2	Bedroom	2.16	1.57	Yes
18	05_Apt 7 Living/Kitchen	Living	14.78	5.01	Yes
19	05_Apt 8 Bedroom 1	Bedroom	2.16	1.95	Yes

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
20	05_Apt 8 Living/Kitchen	Living	9.43	3.26	Yes
21	05_Apt 9 Bedroom 1	Bedroom	2.16	1.97	Yes
22	05_Apt 9 Living/Kitchen	Living	7.27	2.74	Yes
23	05_Apt 10 Bedroom 1	Bedroom	2.16	1.76	Yes
24	05_Apt 10 Living/Kitchen	Living	7.27	2.74	Yes
25	05_Apt 11 Bedroom 1	Bedroom	12.07	7.49	Yes
26	05_Apt 11 Living/Kitchen	Living	7.30	4.37	Yes
27	05_Apt 12 Bedroom 1	Bedroom	6.96	6.65	Yes
28	05_Apt 12 Living/Kitchen	Living	7.27	1.49	No
29	05_Apt 13 Bedroom 1	Bedroom	2.16	1.61	Yes
30	05_Apt 13 Living/Kitchen	Living	7.27	2.65	Yes
31	05_Apt 14 Bedroom 1	Bedroom	2.16	1.76	Yes
32	05_Apt 14 Living/Kitchen	Living	9.43	3.20	Yes

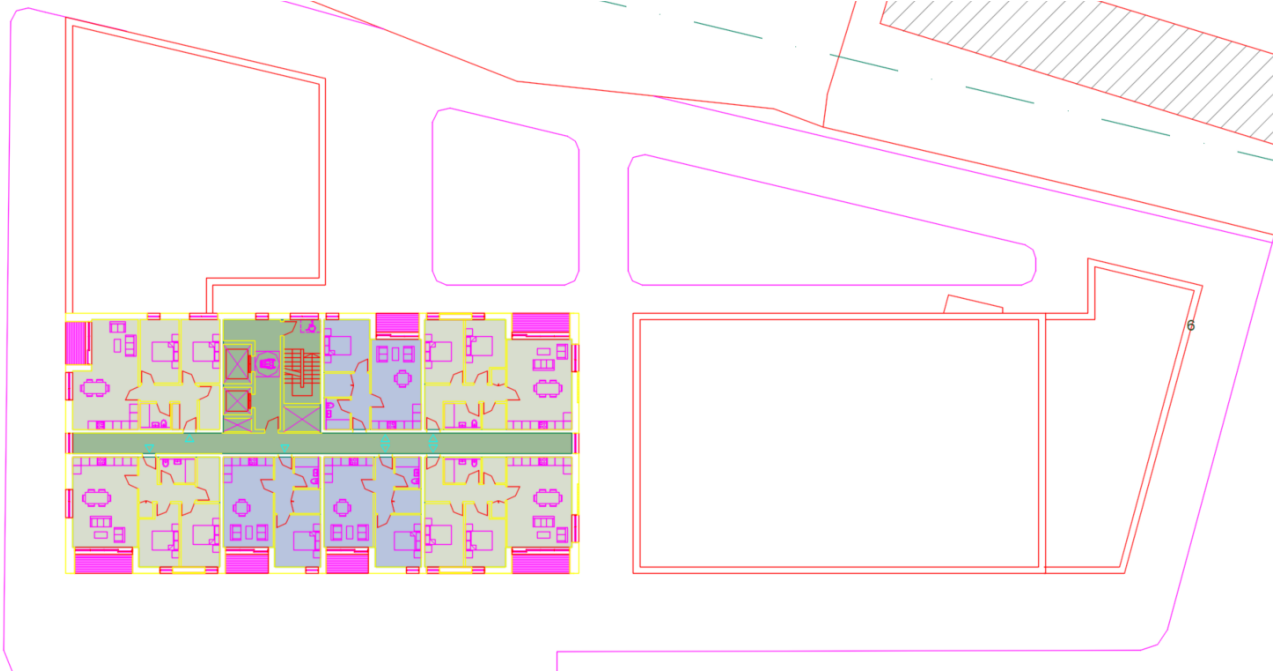
Level 06 Plan



Level 06 ADF Results

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
1	06_Apt 1 Bedroom 1	Bedroom	2.16	2.32	Yes
2	06_Apt 1 Bedroom 2	Bedroom	4.80	4.54	Yes
3	06_Apt 1 Living/Kitchen	Living	14.64	4.77	Yes
4	06_Apt 2 Bedroom 1	Bedroom	7.27	3.05	Yes
5	06_Apt 2 Living/Kitchen	Living	6.72	3.72	Yes
6	06_Apt 3 Bedroom 1	Bedroom	7.26	3.07	Yes
7	06_Apt 3 Living/Kitchen	Living	6.70	3.67	Yes
8	06_Apt 4 Bedroom 1	Bedroom	4.8	4.46	Yes
9	06_Apt 4 Bedroom 2	Bedroom	2.16	2.34	Yes
10	06_Apt 4 Living/Kitchen	Living	14.78	4.88	Yes
11	06_Apt 5 Bedroom 1	Bedroom	2.16	1.86	Yes
12	06_Apt 5 Bedroom 2	Bedroom	4.80	4.15	Yes
13	06_Apt 5 Living/Kitchen	Living	19.19	6.97	Yes
14	06_Apt 6 Living/Kitchen	Living	6.65	3.91	Yes
15	06_Apt 7 Bedroom 1	Bedroom	7.27	2.96	Yes
16	06_Apt 8 Bedroom 1	Bedroom	2.16	2.13	Yes
17	06_Apt 8 Bedroom 2	Bedroom	4.80	4.13	Yes
18	06_Apt 8 Living/Kitchen	Living	14.78	4.88	Yes

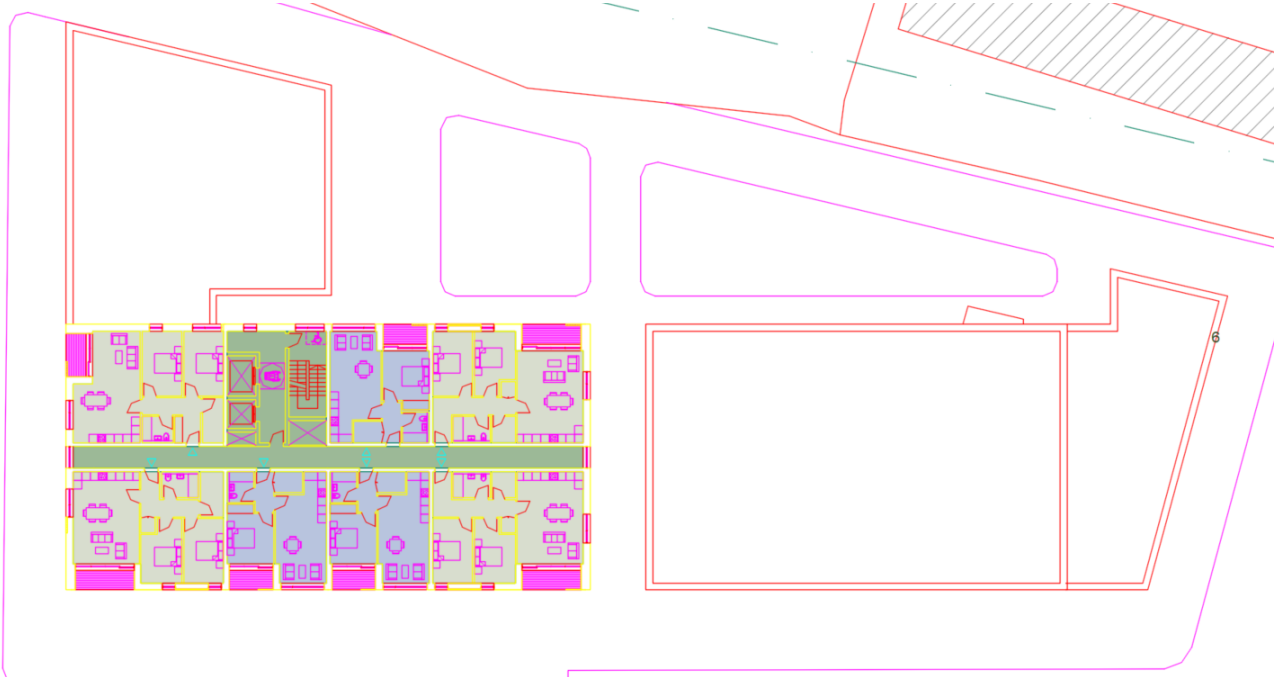
Level 07 Plan



Level 07 ADF Results

Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
1	07_Apt 1 Bedroom 1	Bedroom	2.16	2.07	Yes
2	07_Apt 1 Bedroom 2	Bedroom	2.16	1.65	Yes
3	07_Apt 1 Living/Kitchen	Living	14.78	5.64	Yes
4	07_Apt 2 Bedroom 1	Bedroom	2.16	1.98	Yes
5	07_Apt 2 Living/Kitchen	Living	7.27	2.73	Yes
6	07_Apt 3 Bedroom 1	Bedroom	2.16	1.79	Yes
7	07_Apt 3 Living/Kitchen	Living	7.27	2.64	Yes
8	07_Apt 4 Bedroom 1	Bedroom	2.16	1.69	Yes
9	07_Apt 4 Bedroom 2	Bedroom	2.16	2.07	Yes
10	07_Apt 4 Living/Kitchen	Living	20.06	5.10	Yes
11	07_Apt 5 Bedroom 1	Bedroom	2.16	1.78	Yes
12	07_Apt 5 Bedroom 2	Bedroom	2.16	1.80	Yes
13	07_Apt 5 Living/Kitchen	Living	16.20	5.40	Yes
14	07_Apt 6 Bedroom 1	Bedroom	2.16	1.77	Yes
15	07_Apt 6 Living/Kitchen	Living	7.27	2.70	Yes
16	07_Apt 7 Bedroom 1	Bedroom	2.16	1.91	Yes
17	07_Apt 7 Bedroom 2	Bedroom	2.16	1.61	Yes
18	07_Apt 7 Living/Kitchen	Living	20.06	5.08	Yes

Level 08 Plan



Level 08 ADF Results

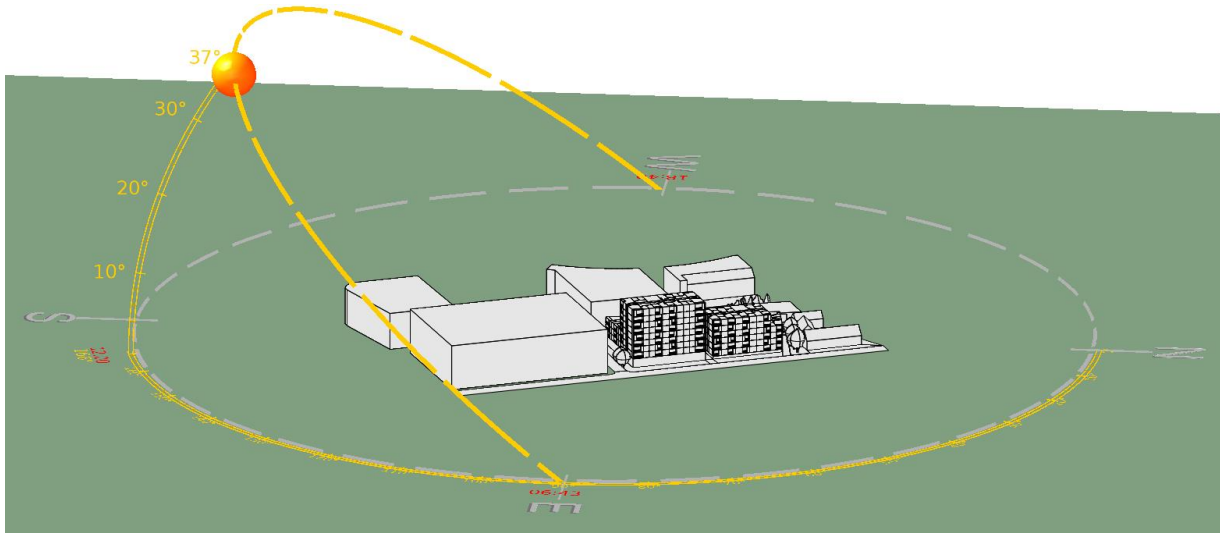
Reference Number	Room Name	Room Activity	External Window Area (m ²)	% ADF	Achieves the BRE Best Practice Guidelines
1	08_Apt 1 Bedroom 1	Bedroom	2.16	2.22	Yes
2	08_Apt 1 Bedroom 2	Bedroom	4.80	4.34	Yes
3	08_Apt 1 Living/Kitchen	Living	14.64	4.92	Yes
4	08_Apt 2 Bedroom 1	Bedroom	7.27	3.49	Yes
5	08_Apt 2 Living/Kitchen	Living	6.72	3.6	Yes
6	08_Apt 3 Bedroom 1	Bedroom	7.27	3.5	Yes
7	08_Apt 3 Living/Kitchen	Living	6.76	3.58	Yes
8	08_Apt 4 Bedroom 1	Bedroom	4.80	4.24	Yes
9	08_Apt 4 Bedroom 2	Bedroom	2.16	2.26	Yes
10	08_Apt 4 Living/Kitchen	Living	14.78	5.08	Yes
11	08_Apt 5 Bedroom 1	Bedroom	2.16	1.81	Yes
12	08_Apt 5 Bedroom 2	Bedroom	4.80	4.03	Yes
13	08_Apt 5 Living/Kitchen	Living	19.19	7.04	Yes
14	08_Apt 6 Living/Kitchen	Living	6.71	3.78	Yes
15	08_Apt 7 Bedroom 1	Bedroom	7.27	3.31	Yes
16	08_Apt 8 Bedroom 1	Bedroom	2.16	2.09	Yes
17	08_Apt 8 Bedroom 2	Bedroom	4.80	3.99	Yes
18	08_Apt 8 Living/Kitchen	Living	14.78	5.38	Yes

9. SUNLIGHT RESULTS

For the BRE Guidance on sunlight refer to page 16 of this report



Above: Google Earth Image of the existing site.

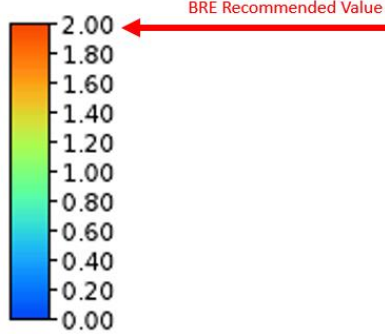


Above: Sun path over the proposed development on the 21st March.

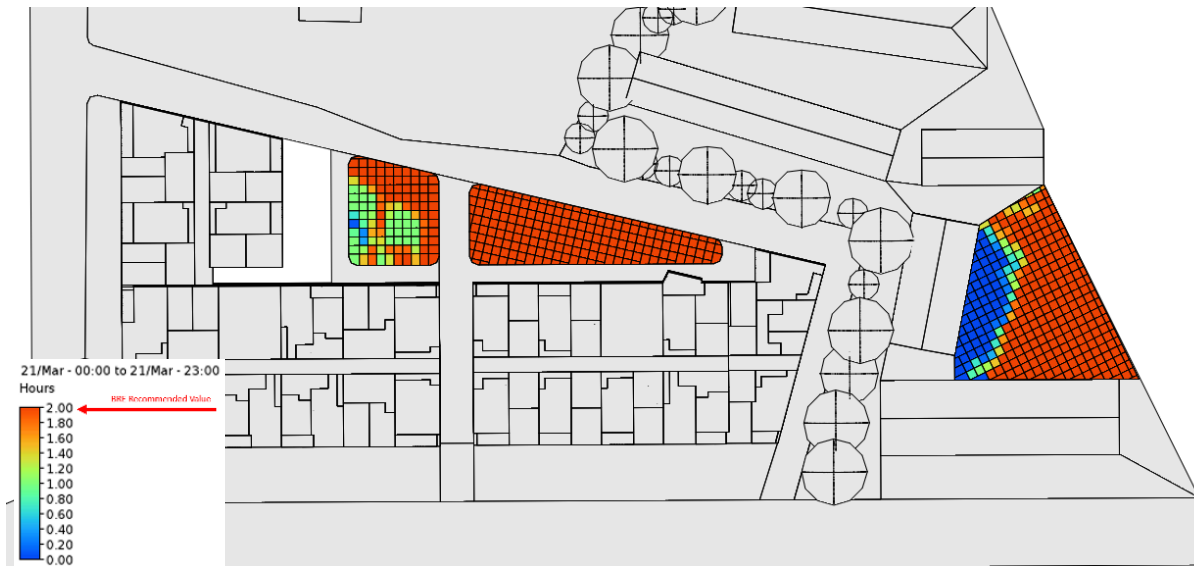
Annual Probable Sunlight Hours – Amenity Spaces

21/Mar - 00:00 to 21/Mar - 23:00

Hours



Above: Probable sunlight hours on March 21st (hours) legend

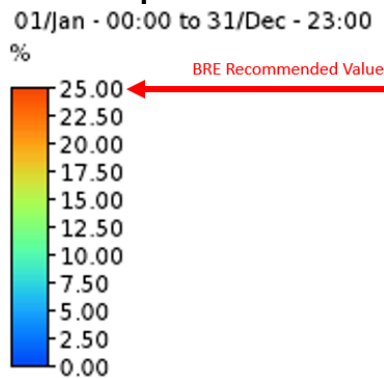


Above: The amenity area of the proposed development shown in red above is achieving 2 hours of sunshine on the 21st March over more than 50% of its area as per the BRE Industry Guidelines. The back garden of surrounding buildings 1 and 2 is also receiving 2 hours or sunlight over more than 50% of its area on the 21st of march as per BRE Industry Guidelines. As shown, the shaded area is caused by the housing block to the south rather than the proposed development. The proposed development has not caused any significant loss of sun light as demonstrated using simulation modelling.

Annual Probable Sunlight Hours – Proposed Development

As outlined in *Section 6* of this report, the living spaces of these developments will appear adequately sunlit provided they receive 25% of their annual probable sunlight hours during the year and 5% of their probable sunlight hours during the winter months. The results of this assessment are represented below for all relevant areas.

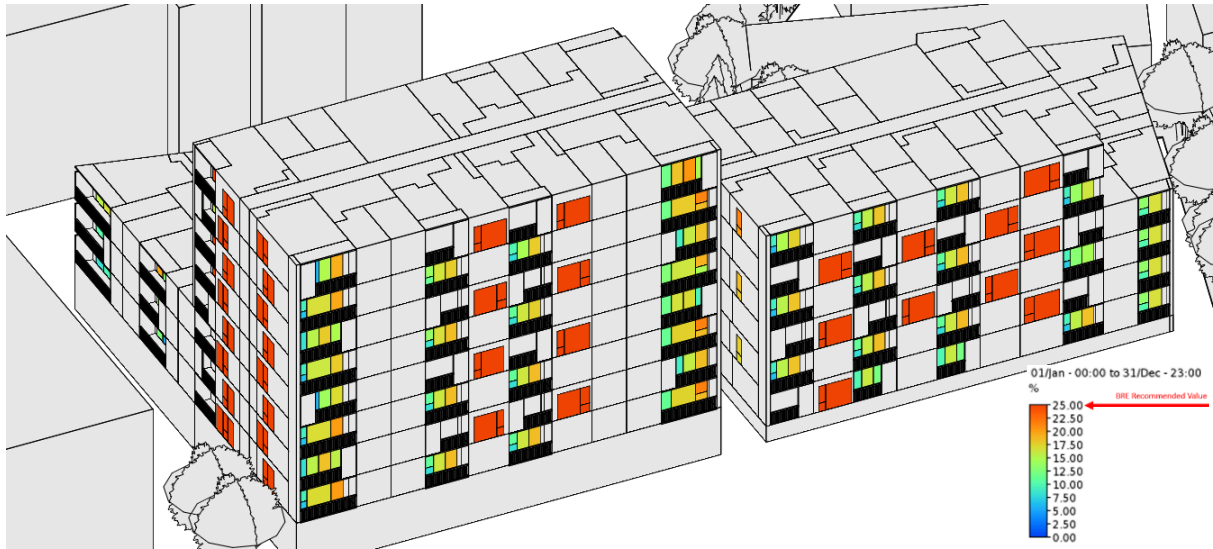
Annual Assessment – Proposed Development



Above: Annual probable sunlight hours (%) legend



Above: The image above (taken from the south west) shows the living spaces within the proposed development that achieve 25% of their annual probable sunlight hours (highlighted in red) meaning these spaces will appear reasonably sunlit in line with BRE 209 guidance.

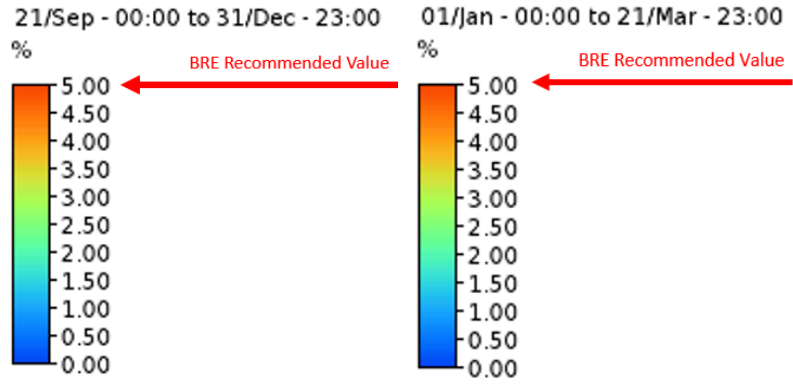


Above: The image above (taken from the east) shows the living spaces within the proposed development that achieve 25% of their annual probable sunlight hours (highlighted in red) meaning these spaces will appear reasonably sunlit in line with BRE 209 guidance.

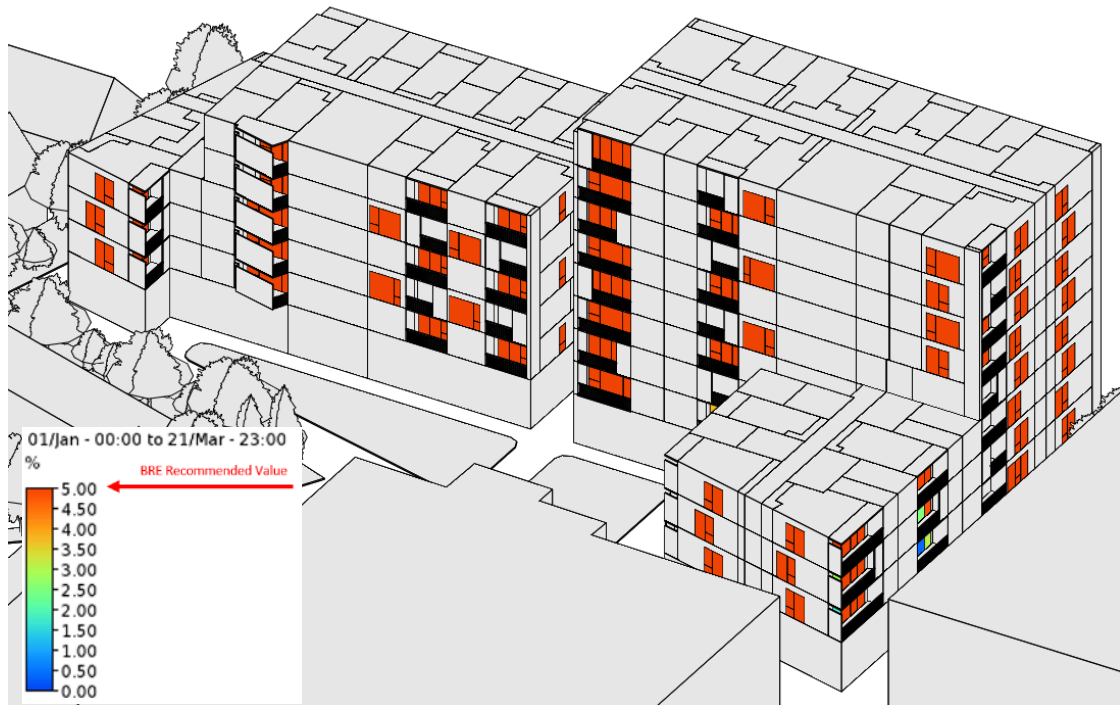
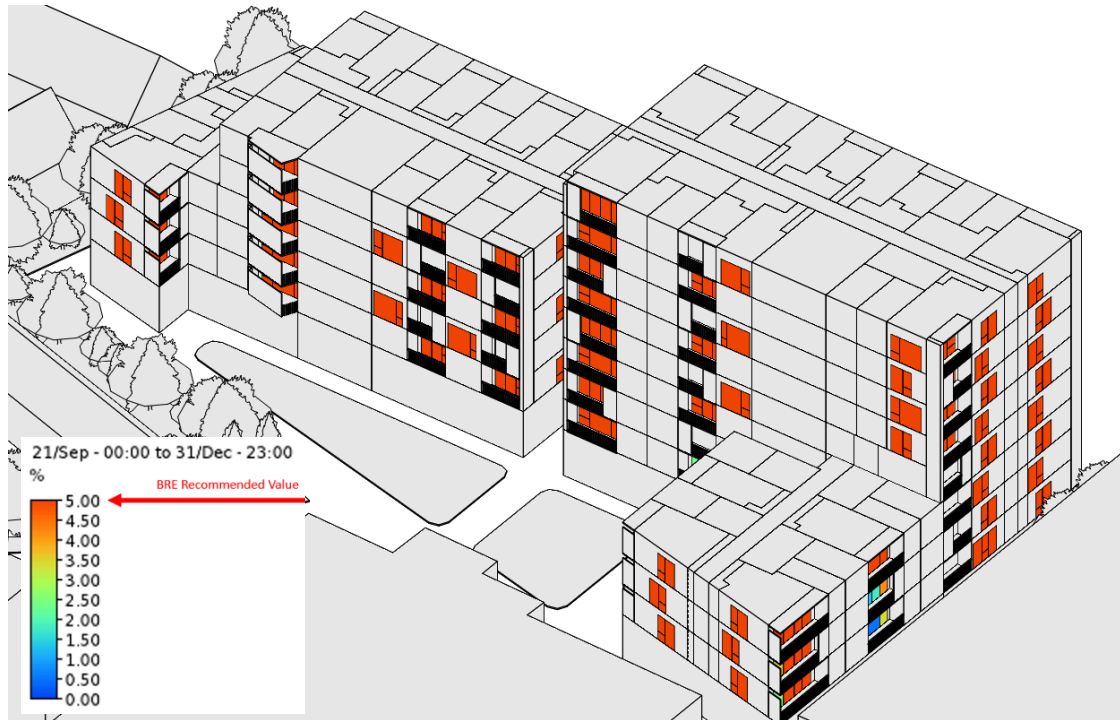
It should be noted that windows that are more than 90° from due south are not expected to achieve the criteria outlined in the BRE Guide and so should not be considered as part of the annual probable sunlight analysis.

In general, the majority of windows assessed meet the annual probable sunlight hours criteria outlined in the BRE Guide as shown in the above model images for the annual assessment.

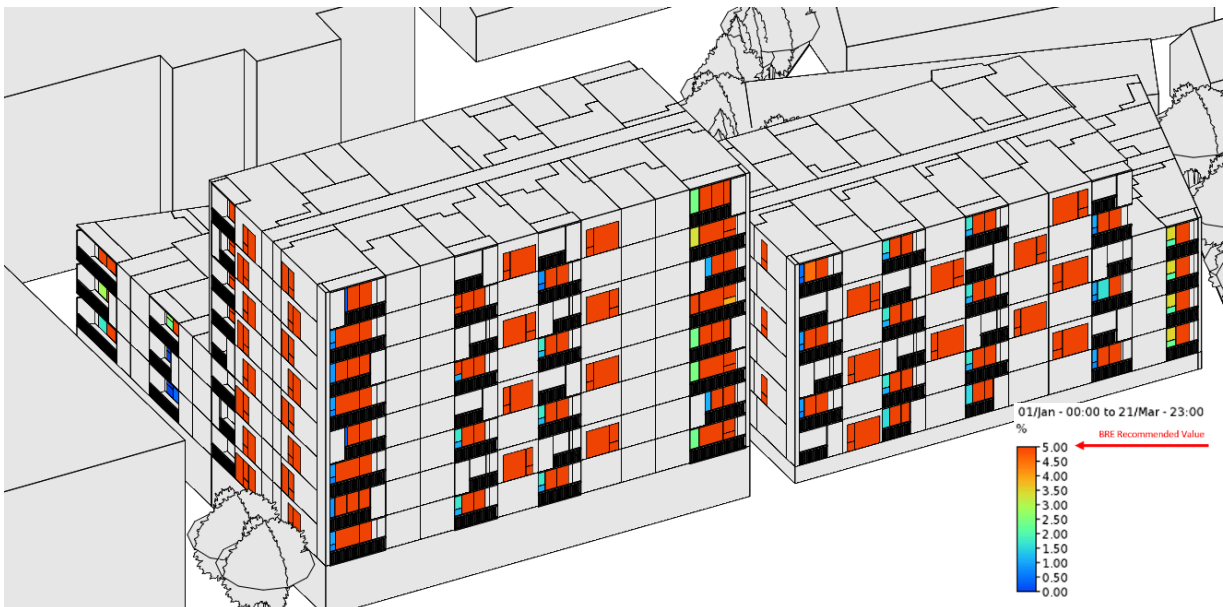
Annual Probable Sunlight Hours – Proposed Development: Winter Assessment



Above: Probable sunlight hours from September 21st to March 21st (%) legend



Above: The images above (taken from the south west) show the living spaces within the proposed development that achieve 5% of their probable sunlight hours during winter months between 21st of September and 21st of March (highlighted in red) meaning these spaces will appear reasonably sunlit in line with BRE 209 guidance. The guidance states that the site layout should aim to maximise the number of dwellings with a main living room that meets the above recommendations.

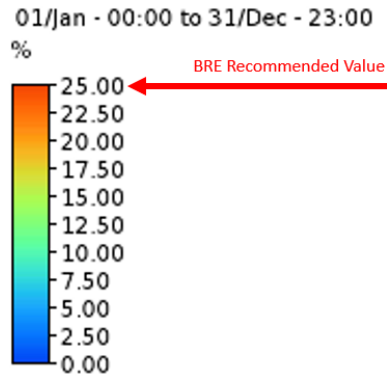


Above: The images above (taken from the east) show the living spaces within the proposed development that achieve 5% of their probable sunlight hours during winter months between 21st of September and 21st of March (highlighted in red) meaning these spaces will appear reasonably sunlit in line with BRE 209 guidance. The guidance states that the site layout should aim to maximise the number of dwellings with a main living room that meets the above recommendations.

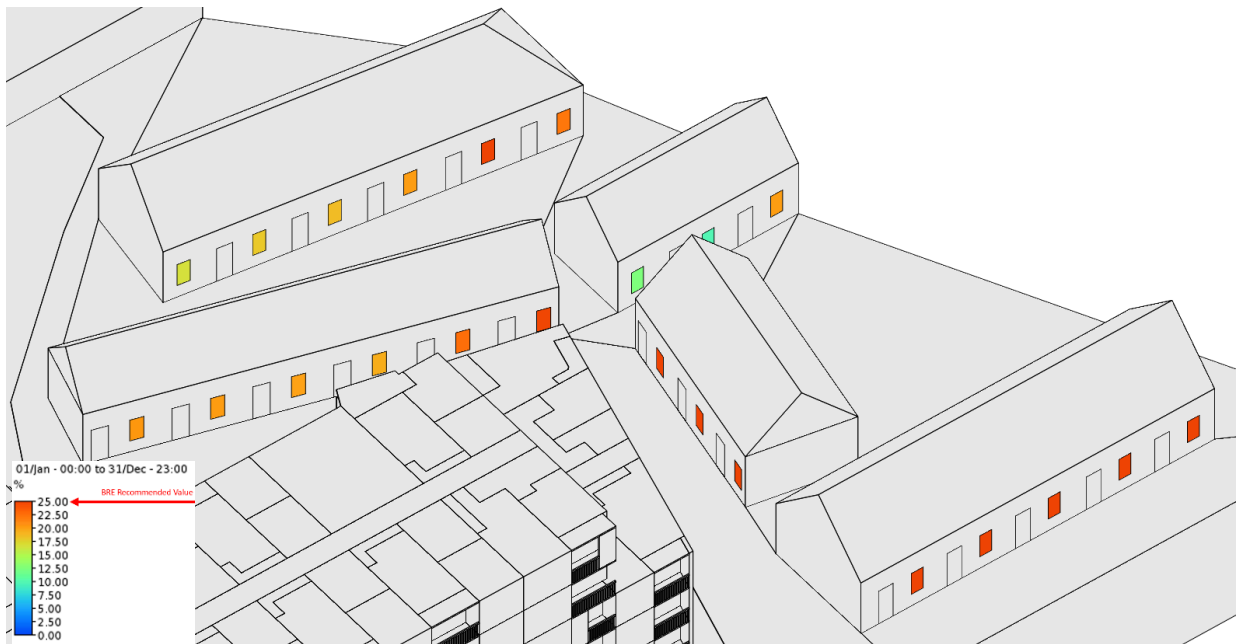
It should be noted that windows that are more than 90° from due south are not expected to achieve the criteria outlined in the BRE Guide and so should not be considered as part of the annual probable sunlight analysis.

In general, the majority of windows assessed meet the annual probable sunlight hours criteria outlined in the BRE Guide as shown in the above model images for the winter assessment.

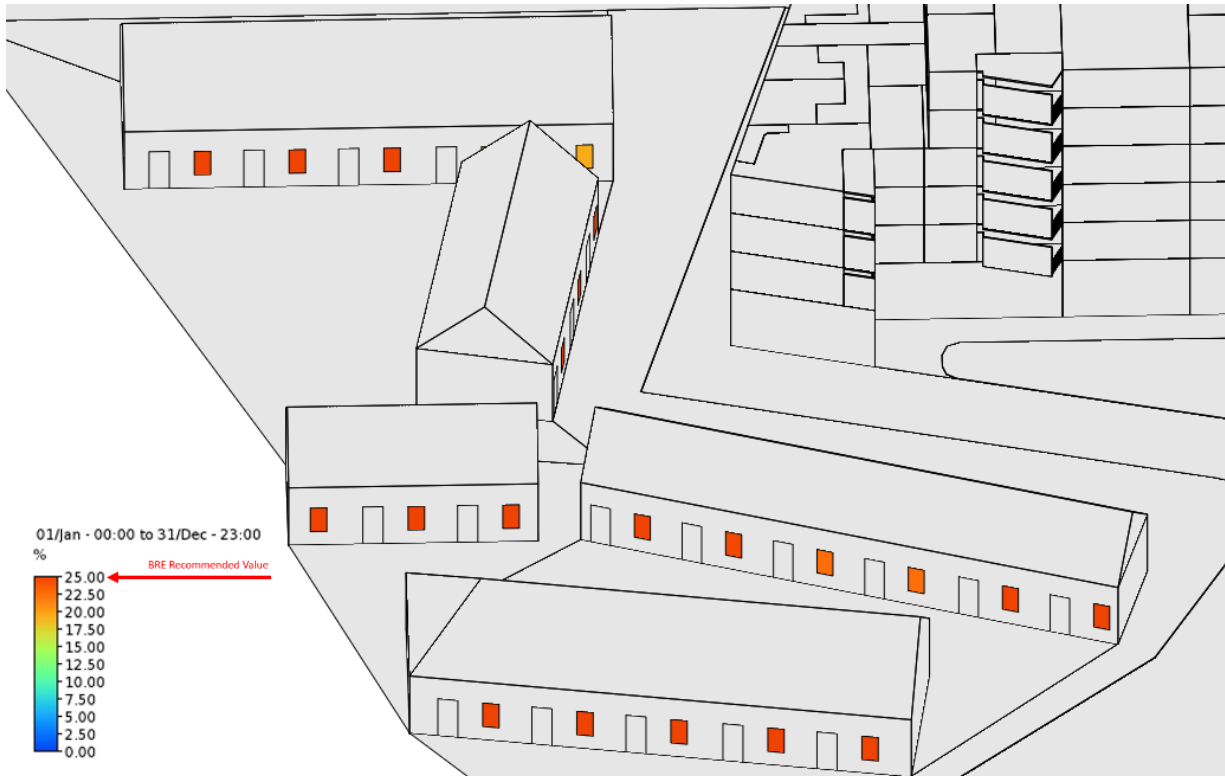
Annual Probable Sunlight Hours – Surrounding Buildings: Annual Assessment



Above: Annual probable sunlight hours (%) legend



Above: The image above shows that the occupied surrounding buildings (Blocks 1 and 2) achieve 25% of their annual probable sunlight hours (highlighted in red) meaning these spaces will appear reasonably sunlit in line with BRE 209 guidance. With regard to some of the windows that do not achieve the criteria, these houses are unoccupied and derelict and so the lack of sunlight is not critical in these spaces. In some cases within the unoccupied blocks, the annual probable sunlight hours are affected by other existing surrounding buildings in close proximity.

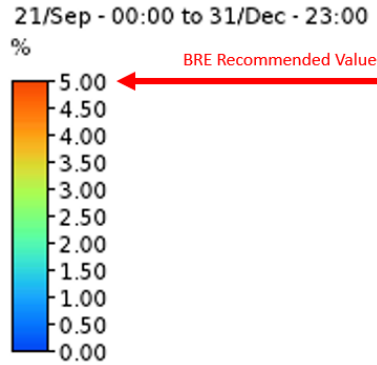


Above: The image above shows that the occupied surrounding buildings (Blocks 1 and 2) achieve 25% of their annual probable sunlight hours (highlighted in red) meaning these spaces will appear reasonably sunlit in line with BRE 209 guidance. In some cases, the annual probable sunlight hours are affected by other existing surrounding buildings in close proximity rather than the proposed development.

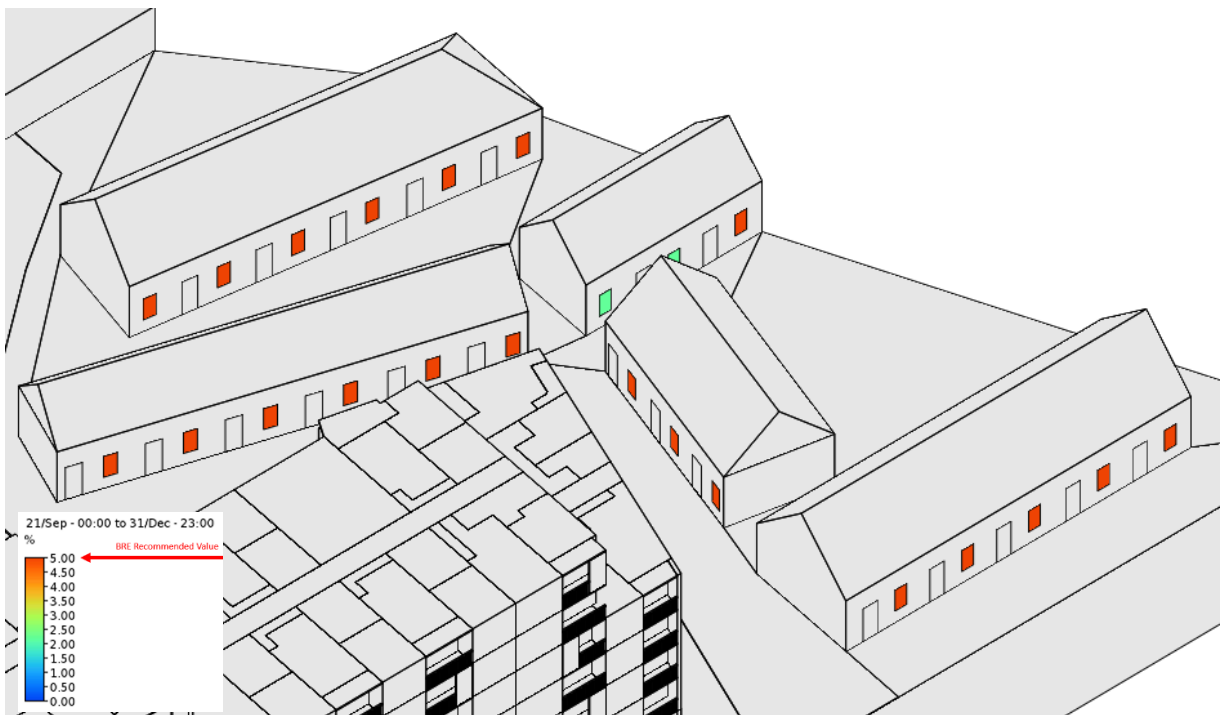
It should be noted that windows that are more than 90° from due south are not expected to achieve the criteria outlined in the BRE Guide and so should not be considered as part of the annual probable sunlight analysis.

In general, the majority of relevant windows assessed meet the annual probable sunlight hours criteria outlined in the BRE Guide as shown in the above model images for the annual assessment.

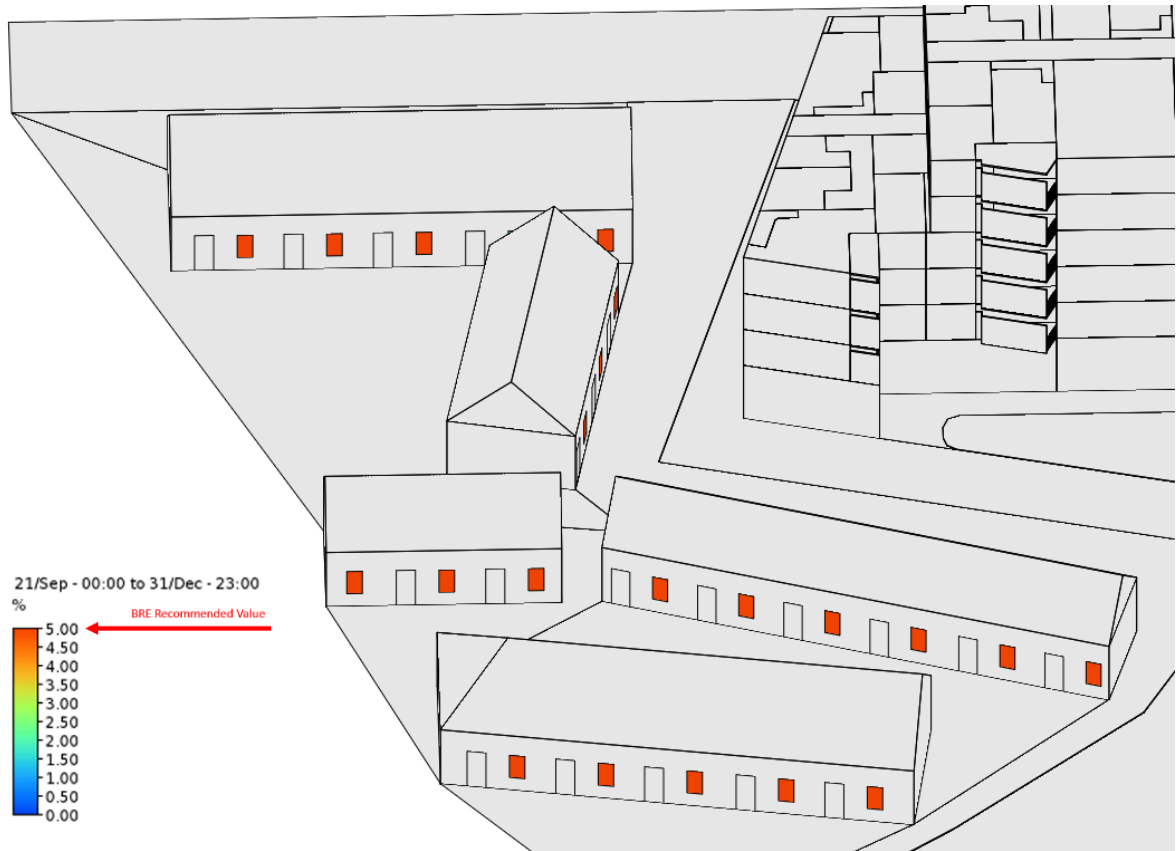
Annual Probable Sunlight Hours – Surrounding Buildings: Winter Assessment



Above: Probable sunlight hours from September 21st to March 21st (%) legend



Above: The image above shows that the occupied surrounding buildings (Blocks 1 and 2) achieve 5% of their probable sunlight hours during winter months between 21st of September and 21st of March (highlighted in red) meaning these spaces will appear reasonably sunlit in line with BRE 209 guidance. With regard to some of the windows that do not achieve the criteria (Block 3), these houses are unoccupied and derelict and so the lack of sunlight is not critical in these spaces. In some cases within the unoccupied blocks, the annual probable sunlight hours are affected by other existing surrounding buildings in close proximity rather than the proposed development.



Above: The images above show that all surrounding buildings assessed achieve 5% of their probable sunlight hours during winter months between 21st of September and 21st of March (highlighted in red) meaning these spaces will appear reasonably sunlit in line with BRE 209 guidance.

10. SUMMARY CONCLUSION

Passive Dynamics Sustainability Consultants has prepared this Daylight, Sunlight and Overshadowing report for and on behalf of Bellmount Developments Limited to accompany the planning application for the proposed Residential Development at Redforge Road, Blackpool, Cork. The scope of the assessment was to determine the following:

- Impact of loss of daylight to neighboring properties
- Average Daylight Factor within the proposed apartments
- Sunlight availability within the proposed amenity space and neighbouring gardens
- Overshadowing analysis and impact to neighbouring properties

Daylight and Sunlight calculations have been carried out in accordance with BRE's 'Site Layout Planning for Sunlight and Daylight: A Guide to Good Practice' (2011) (herein referred to as the "BRE Guide") by P J Littlefair, which is accepted as good practice by Planning Authorities. The Design Standards for New Apartments - Guidelines for Planning Authorities (March 2018) were also considered as part of this study. The results of this analysis are summarised below:

Average Daylight Factor

The calculated ADF results are summarised below:

- 99.33% of Bedrooms achieve the BRE recommended ADF of $\geq 1.00\%$
- 90.35% of Living Rooms achieve the BRE recommended ADF of $\geq 2.00\%$

Vertical Sky Component - Impact of Loss of Daylight to Neighbouring Properties

A simulation was run to quantify any reduction in the vertical sky component (VSC) of the surrounding buildings resulting from the proposed development massing. While the VSC has been reduced in certain areas of the surrounding buildings according to the BRE 209 Guidance Document, the majority of windows assessed meet the criteria outlined in the BRE Guidance Document for VSC. This is outlined in Section 7 of this report with detailed results provided in Appendix B.

Consideration should be given to the fact that the comparison being made is between an existing, under-utilised site and the proposed development, which will inevitably have some form of an impact. Flexibility regarding BRE standards should be applied to balance the objective of achieving urban regeneration with any potential impacts.

Annual Probable Sunlight Hours – Amenity Space

The amenity area of the proposed development achieves 2 hours of sunshine on the 21st March over more than 50% of its area as per the BRE Industry Guidelines. The back garden of surrounding buildings (1 and 2) also receives 2 hours of sunlight over more than 50% of its area on the 21st of March in line with BRE Industry Guidelines. The proposed development has not caused any significant loss of sunlight as demonstrated using simulation modelling.

Annual Probable Sunlight Hours – Proposed Development: Annual Assessment

In general, the openings of the proposed building living spaces that face within 90° of due south largely receive at least 25% of annual probable sunlight hours in line with BRE Guidance.

Annual Probable Sunlight Hours – Proposed Development: Winter Assessment

In general, the openings of the proposed building living spaces that face within 90° of due south largely receive at least 5% of their probable sunlight hours during winter months in line with BRE Guidance.

Annual Probable Sunlight Hours – Surrounding Buildings: Annual Assessment

In general, the openings of the occupied surrounding buildings (Blocks 1 and 2) living spaces that face within 90° of due south largely receive at least 25% of annual probable sunlight hours in line with BRE Guidance.

Annual Probable Sunlight Hours – Surrounding Buildings: Winter Assessment

The openings of the occupied surrounding building living spaces (Blocks 1 and 2) that face within 90° of due south receive at least 5% of probable sunlight hours during winter months in line with BRE Guidance.

With regard to some of the windows that do not achieve the criteria (Blocks 3, 4 and 5), these houses are unoccupied and derelict and so the lack of sunlight is not critical in these spaces. In some cases within the unoccupied blocks, the annual probable sunlight hours are affected by other existing surrounding buildings in close proximity rather than the proposed development.

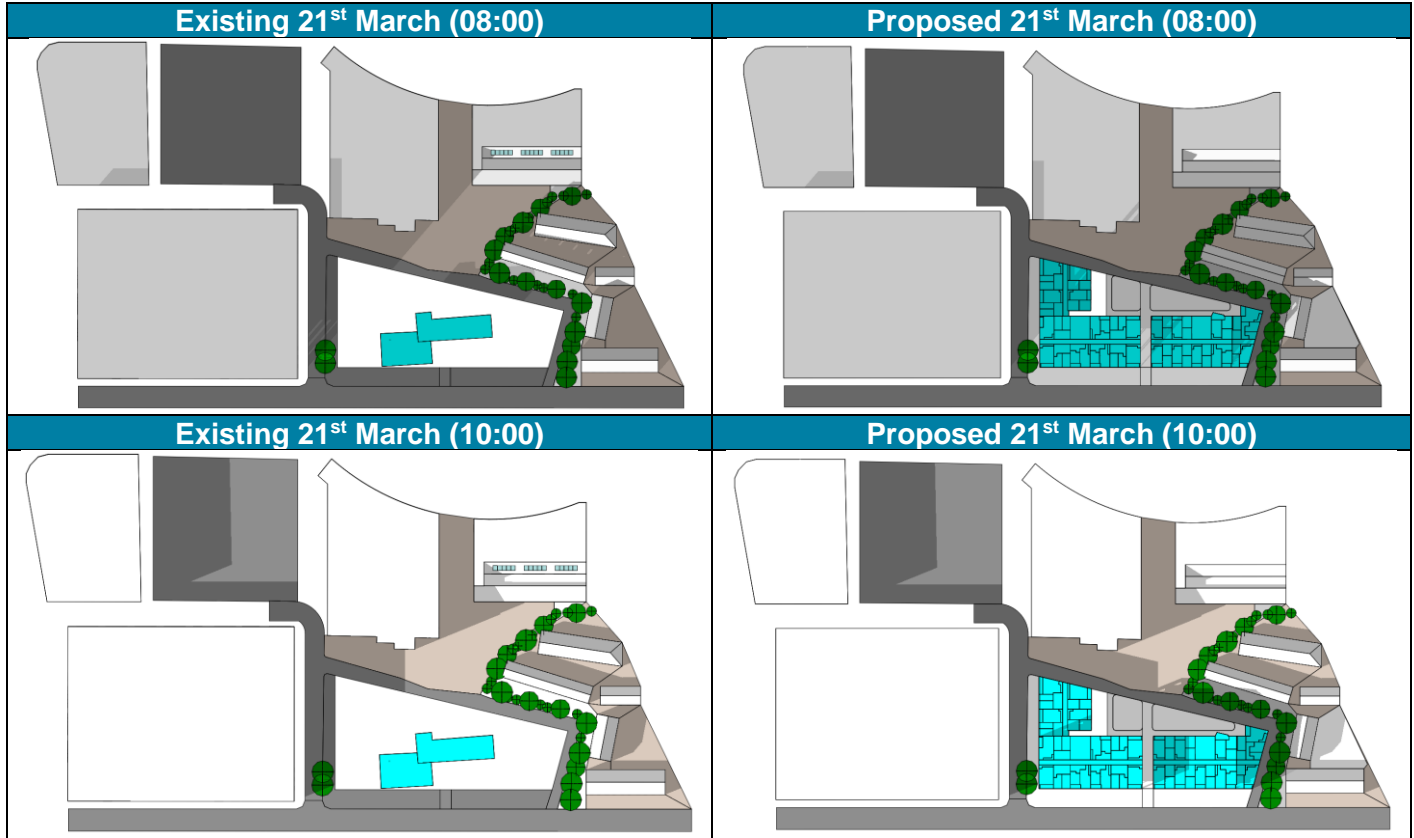
Overshadowing Assessment

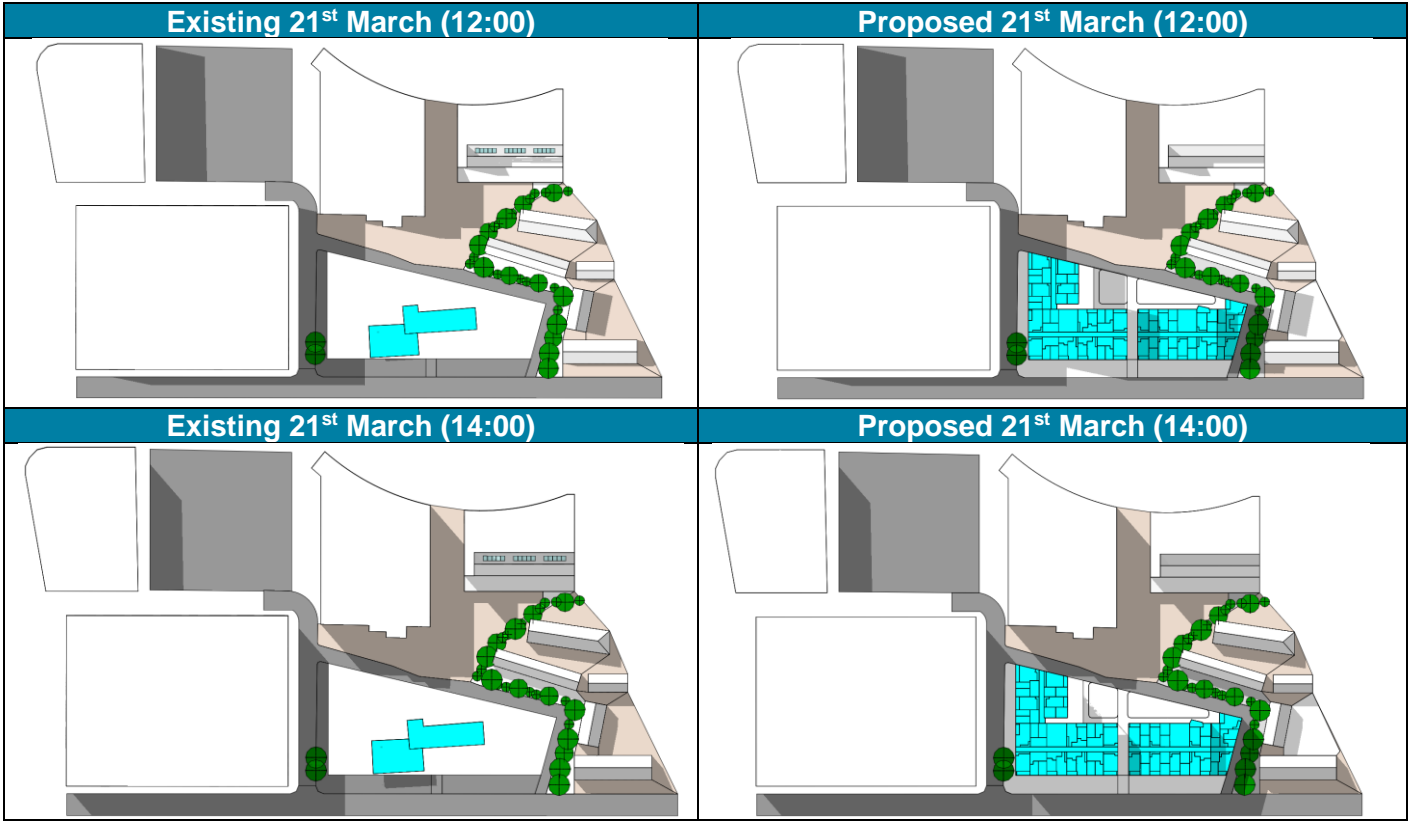
The proposed development has not caused any noticeable overshadowing to neighbouring properties.

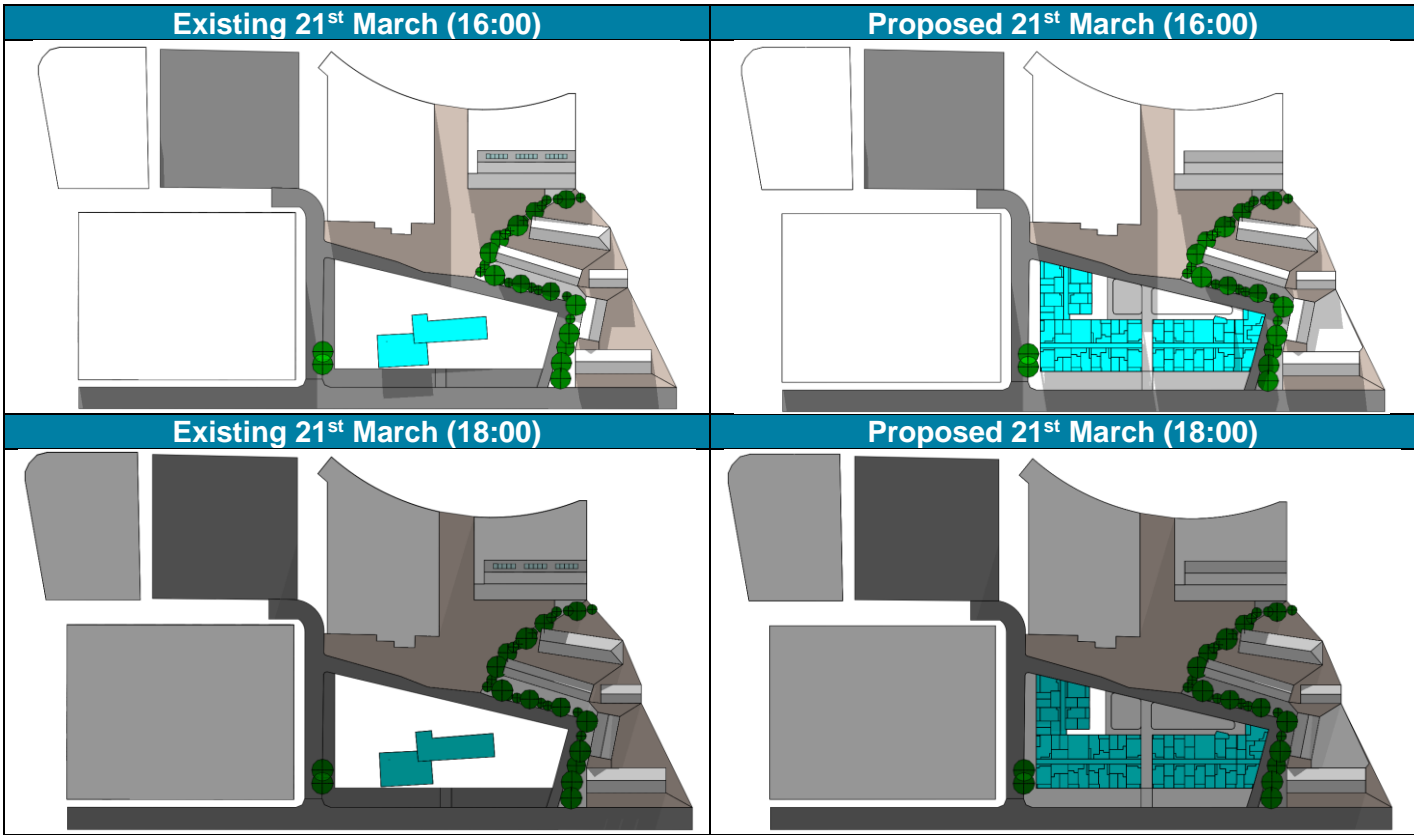
APPENDIX A | OVERSHADOWING IMAGES

Plan View Images

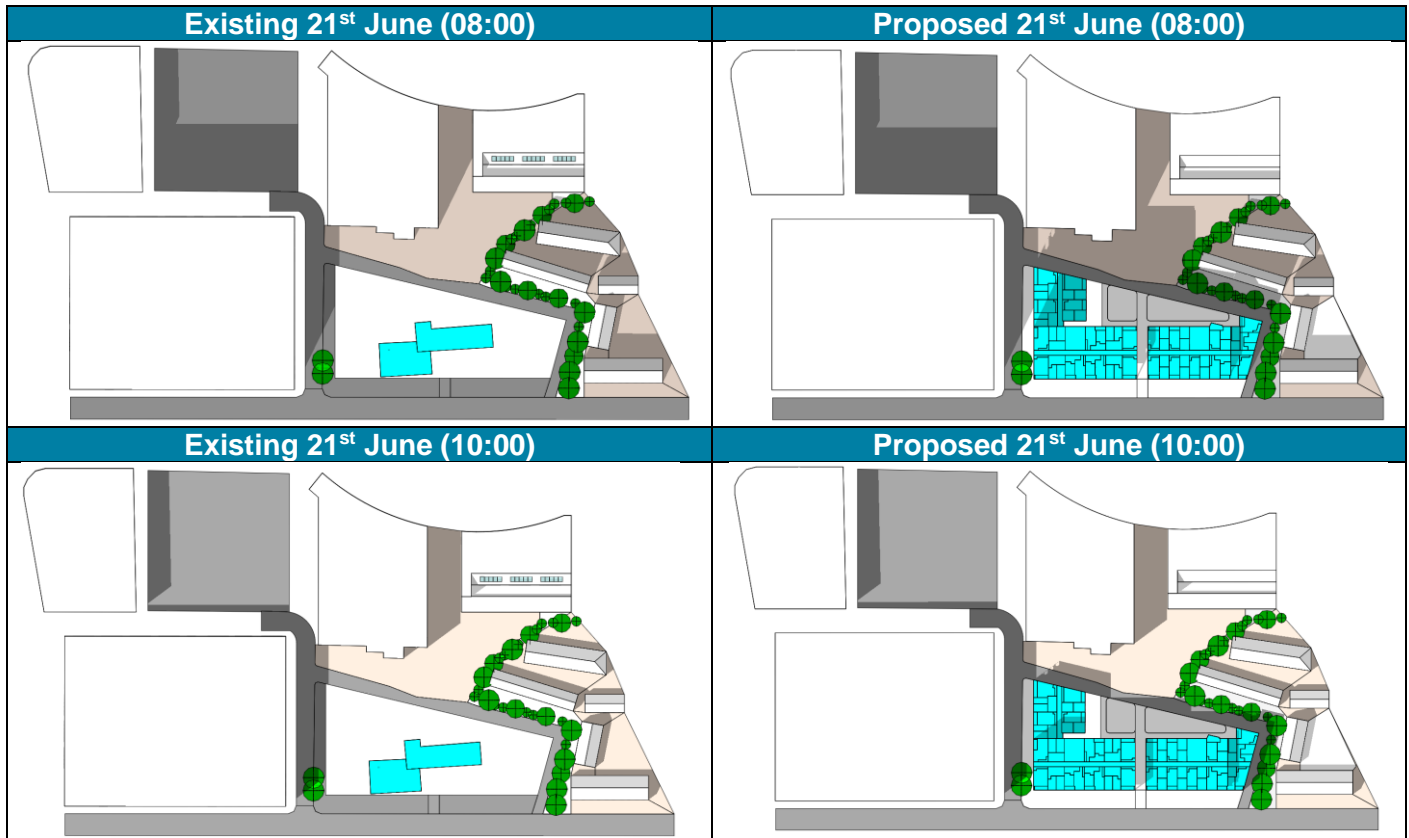
Plan View – 21st March

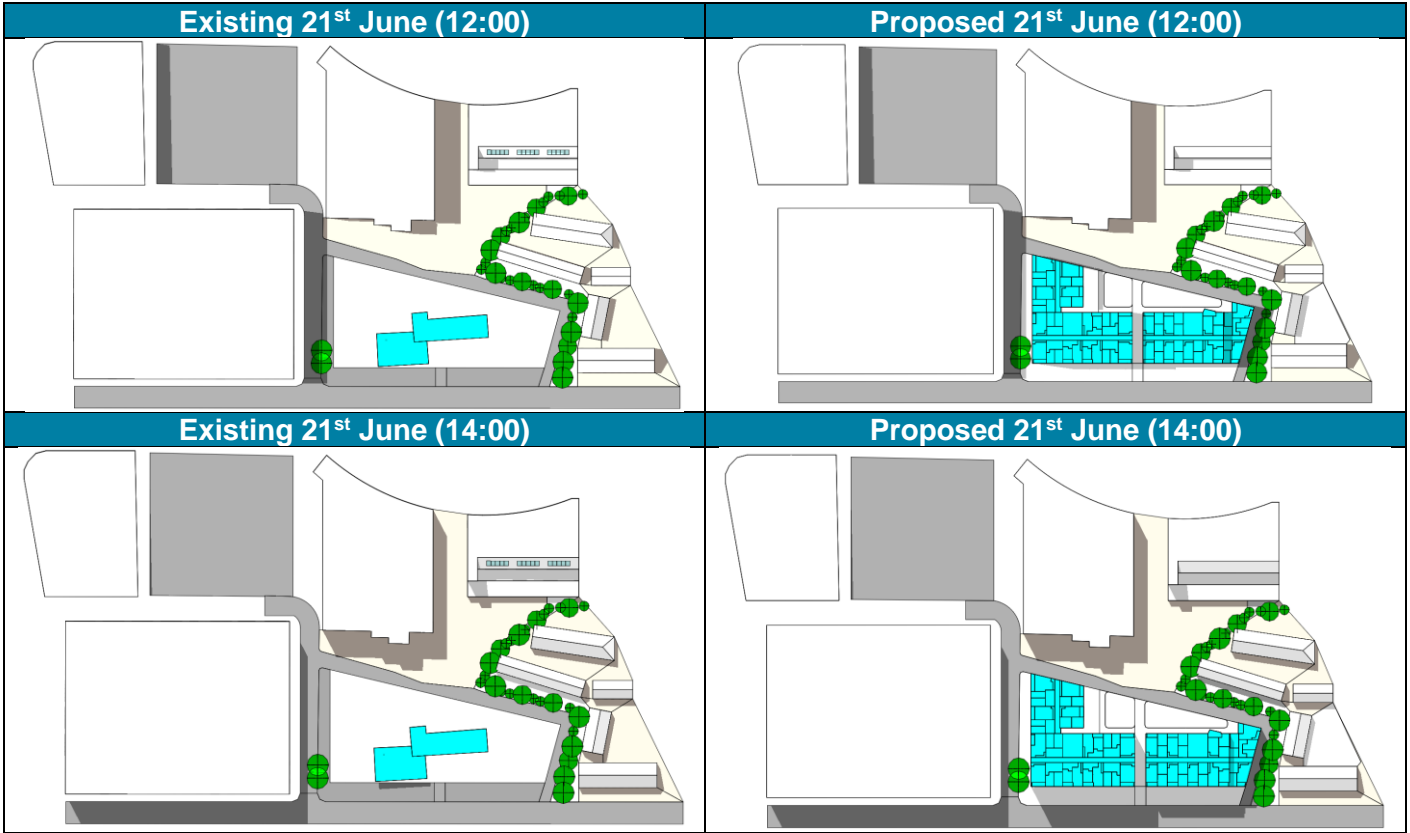


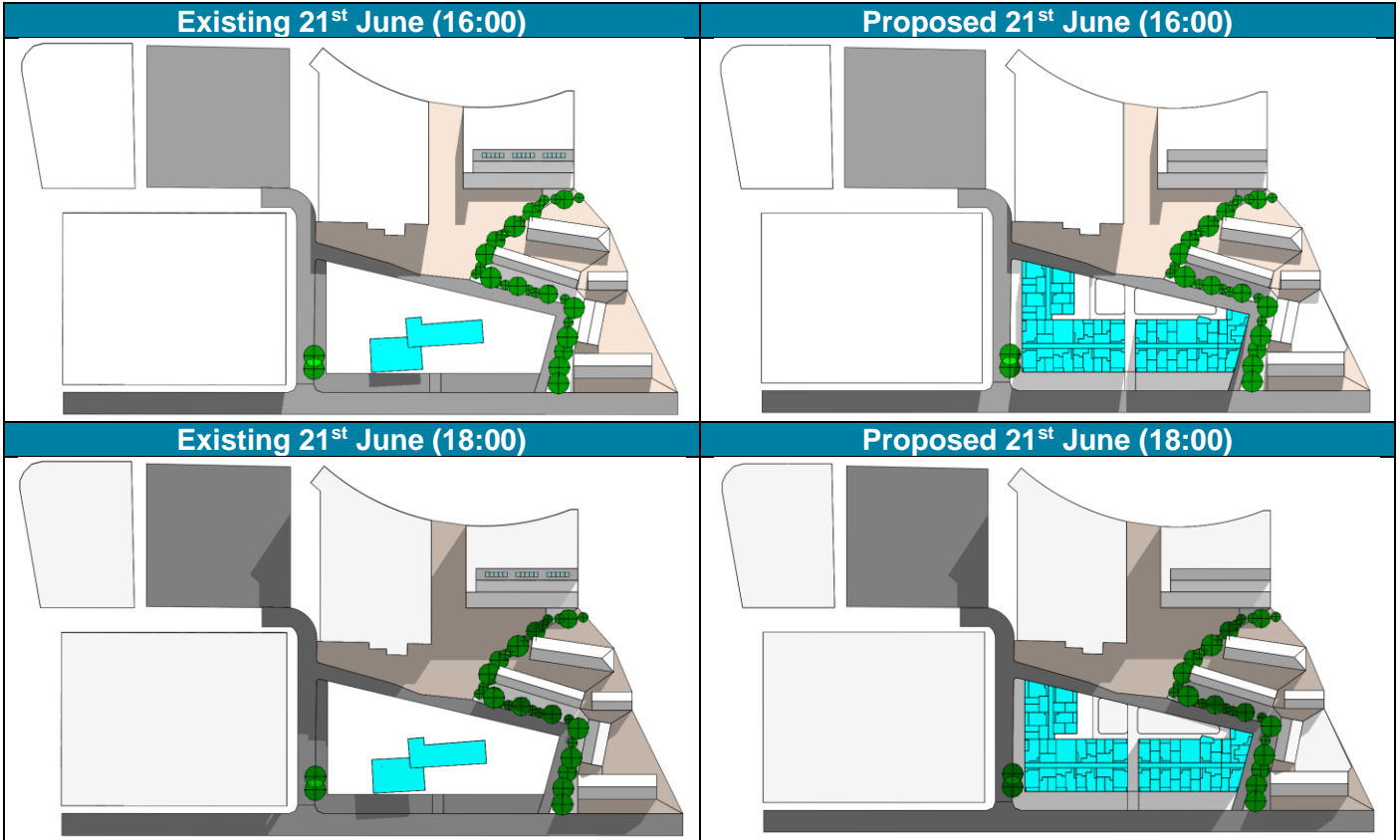




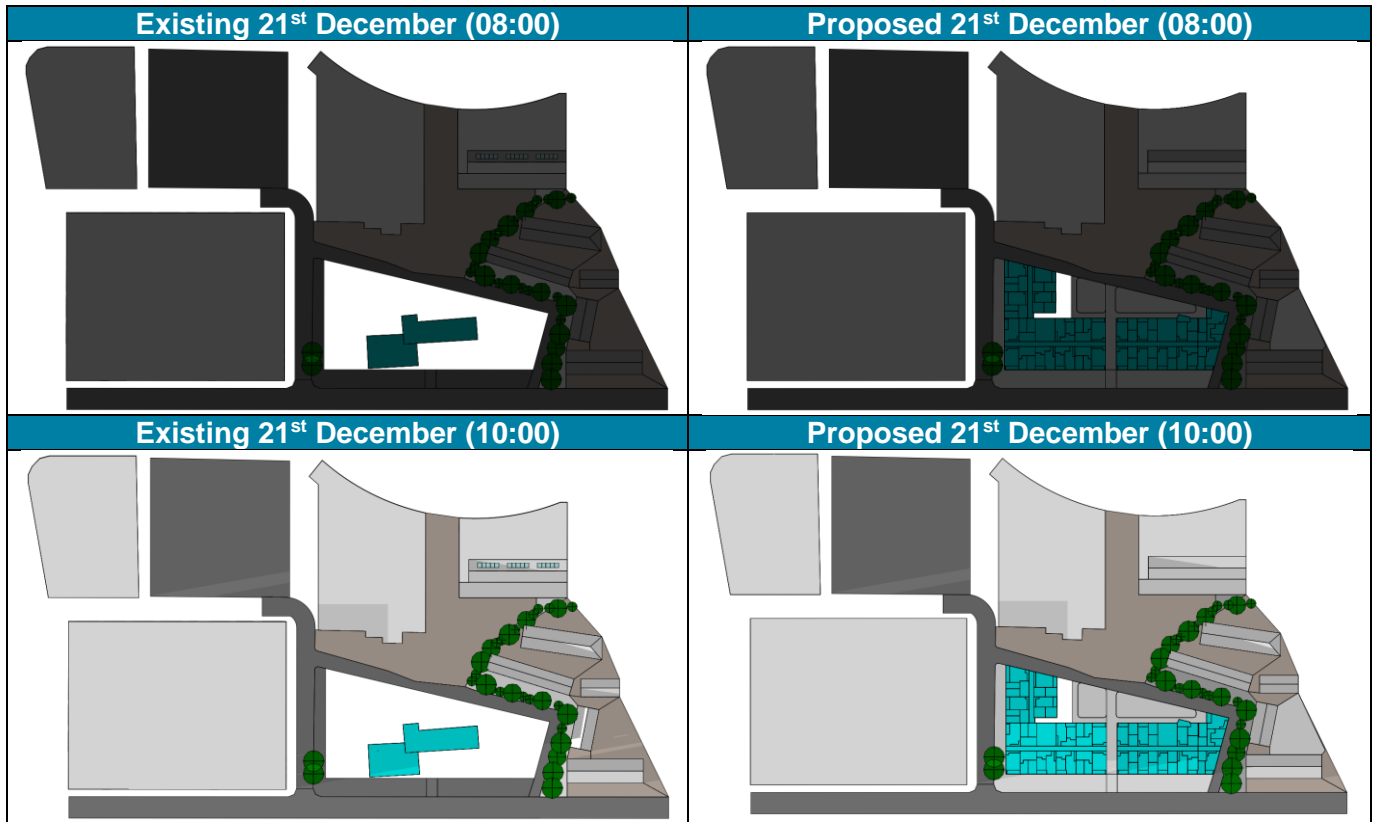
Plan View – 21st June

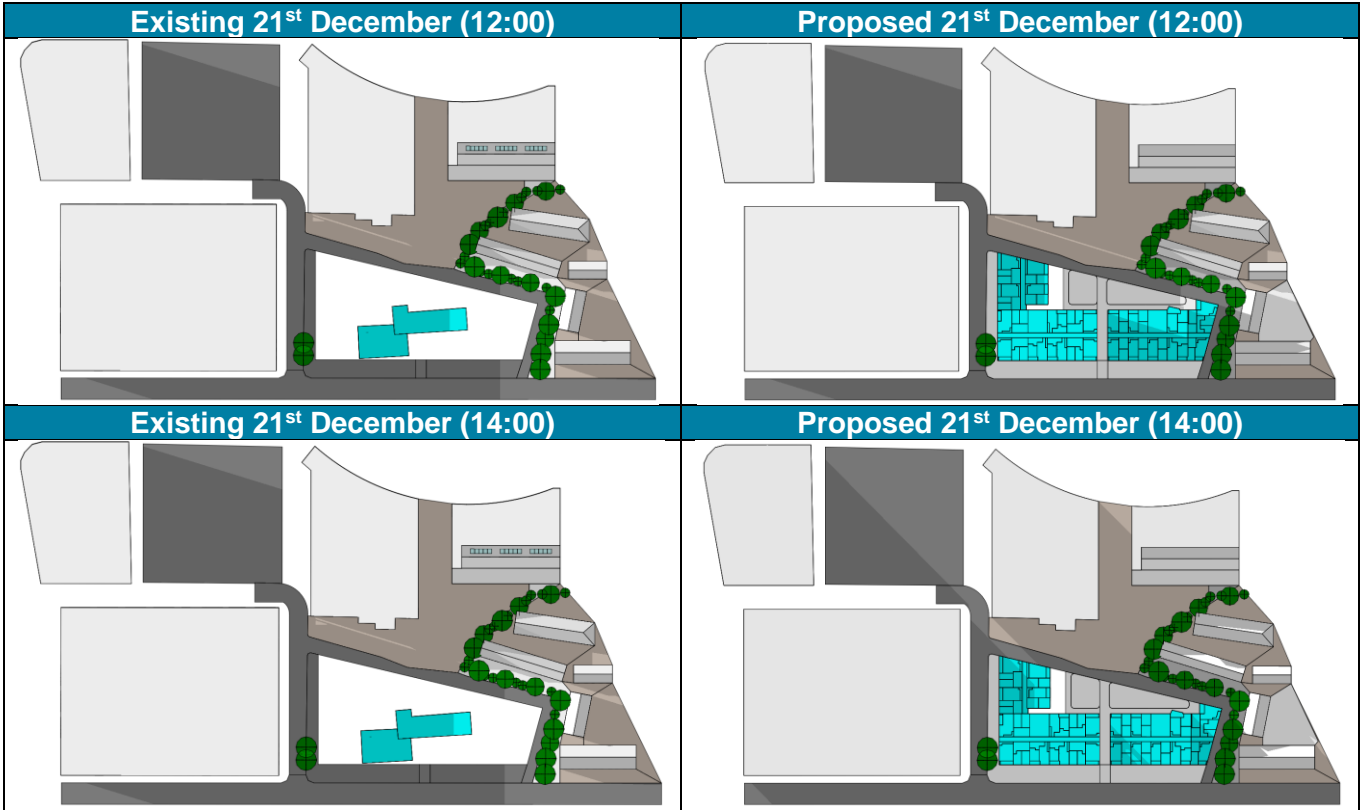


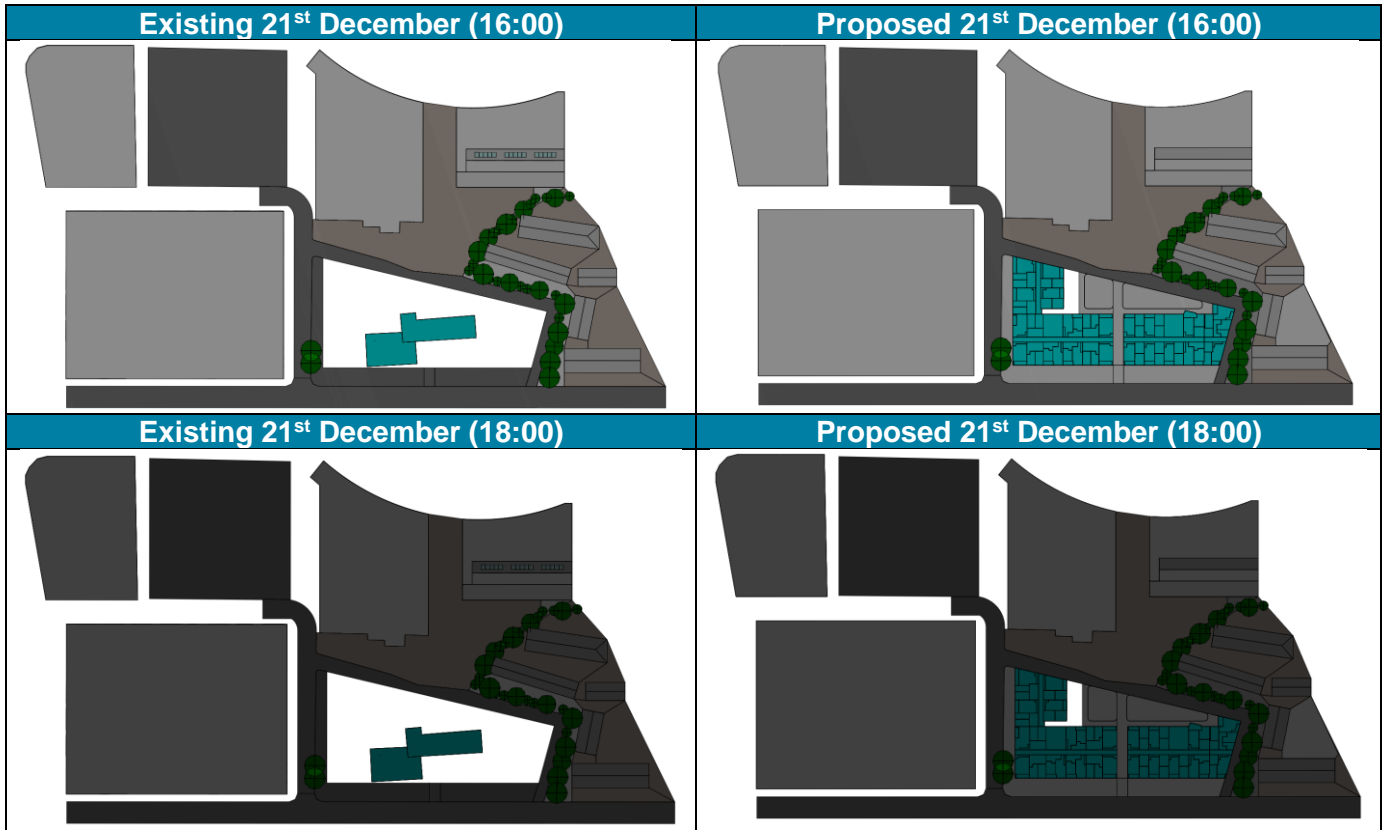




Plan View – 21st December







APPENDIX B | VERTICAL SKY COMPONENT RESULTS (PROPOSED DEVELOPMENT)

Status "Pass2" below indicates a pass (despite a VSC of less than 27%) as the VSC reduction is less than 20%.

Ref No.	Surrounding Building	Surface	Opening	Resultant VSC (Post-Development)	Existing VSC (Pre-Development)	Status	% of Existing VSC Maintained	
5	Block 1	1	0	35.8	35.96	Pass	99.56	Occupied
6	Block 1	1	2	30.69	31.04	Pass	98.87	
7	Block 1	1	5	33.98	34.15	Pass	99.50	
8	Block 1	1	6	16.97	18.88	Pass2	89.88	
9	Block 1	1	9	16.95	21.94	Note 1	77.26	
10	Block 1	2	0	39.23	39.32	Pass	99.77	
11	Block 1	2	2	39.25	39.34	Pass	99.77	
12	Block 1	2	5	39.2	39.2	Pass	100.00	
13	Block 1	2	6	39.25	39.25	Pass	100.00	
14	Block 1	2	9	39.17	39.33	Pass	99.59	
15	Block 2	1	0	24.54	33.54	Note 1	73.17	
16	Block 2	1	2	21.24	34.69	Note 1	61.23	
17	Block 2	1	5	16.96	35.17	Note 1	48.22	
18	Block 2	3	0	32.78	33	Pass	99.33	
19	Block 2	3	2	35.34	35.36	Pass	99.94	
20	Block 2	3	5	35.39	35.39	Pass	100.00	
21	Block 3	1	0	35.59	35.59	Pass	100.00	Unoccupied
22	Block 3	1	1	31.82	31.82	Pass	100.00	
23	Block 3	1	4	27.41	27.41	Pass	100.00	
24	Block 3	2	0	15.02	18.6	Pass2	80.75	
25	Block 3	2	1	25.82	26.33	Pass2	98.06	
26	Block 3	2	4	32.3	32.59	Pass	99.11	
27	Block 4	2	0	27.00	27.00	Pass	100.00	
28	Block 4	2	3	25.32	25.32	Pass2	100.00	
29	Block 4	2	4	23.27	23.3	Pass2	99.87	
30	Block 4	2	7	23.63	23.68	Pass2	99.79	
31	Block 4	2	9	24.52	24.57	Pass2	99.80	
32	Block 4	2	10	25.95	25.95	Pass2	100.00	
33	Block 4	3	0	24.26	33.86	Note 1	71.65	
34	Block 4	3	3	21.87	35.87	Note 1	60.97	
35	Block 4	3	4	17.62	36.82	Note 1	47.85	
36	Block 4	3	7	18.34	36.52	Note 1	50.22	
37	Block 4	3	9	17.29	36.45	Note 1	47.43	
38	Block 4	3	10	17.93	36.34	Note 1	49.34	
39	Block 5	1	0	25.58	25.58	Pass2	100.00	

Ref No.	Surrounding Building	Surface	Opening	Resultant VSC (Post-Development)	Existing VSC (Pre-Development)	Status	% of Existing VSC Maintained	
40	Block 5	1	3	27.91	27.91	Pass	100.00	Unoccupied
41	Block 5	1	4	33.32	33.32	Pass	100.00	
42	Block 5	1	7	31.04	31.04	Pass	100.00	
43	Block 5	1	9	34.61	34.84	Pass	99.34	
44	Block 5	3	0	25.33	25.88	Pass2	97.87	
45	Block 5	3	3	27.37	27.51	Pass	99.49	
46	Block 5	3	4	24.53	24.74	Pass2	99.15	
47	Block 5	3	7	25.41	26.15	Pass2	97.17	
48	Block 5	3	9	23.79	23.81	Pass2	99.92	
49	Block 5	3	10	22.44	22.83	Pass2	98.29	

*Note 1: Result does not meet the recommended BRE guideline value.