

# Daylight & Sunlight Report

Adamstown Development – Block's A, C & D

Project No. Q067

06<sup>th</sup> April 2022



# OCSC

O'CONNOR | SUTTON | CRONIN

Multidisciplinary  
Consulting Engineers



# Daylight & Sunlight Report



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## DOCUMENT CONTROL & HISTORY

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## EXECUTIVE SUMMARY

OCSC have been appointed to carry out a Daylight/ Sunlight study for the Adamstown Development - Blocks A, C & D, located in Adamstown, Co. Dublin.

The aim of the study is to record and analyse the results for the following:

- The daylight levels within the living and bedroom areas of selected apartments, to give an indication of the expected daylight levels throughout the proposed development;
- The expected sunlight levels within the living areas and bedrooms within the proposed development;
- The quality of amenity space, being provided as part of the development, in relation to sunlight;
- Any potential daylight or sunlight impact the proposed development may have on properties adjacent to the site.

The analysis confirms that across the entire development excellent levels of internal daylight are achieved, with a  $\geq 95\%$  compliance rate achieved across the proposed development. The majority of apartments not only meet but greatly exceed the recommendations outlined within the BRE guidelines on "Site Layout Planning for Daylight and Sunlight" by PJ Littlefair, and British Standard BS 8206.

It is important to note that the performance targets which are included should be used with a degree of flexibility as per the extract below from the BRE Guide:

*"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 numeral guidelines these should be interpreted flexibly because natural lighting is only one of the many factors in site layout design."*

### Internal daylight within the proposed development

The analysis confirms that across the entire development excellent levels of internal daylight are achieved. The majority of apartments not only meet but greatly exceed the recommendations

outlined within the BRE Guidelines and British Standard BS 8206, achieving  $\geq 95\%$  compliance across the proposed development.

#### Sunlight to proposed development amenity spaces

In terms of sunlight access, excellent levels of sunlight are experienced across the proposed amenity space. The communal amenity space provided exceed the BRE guidelines for sunlight on the test day of 21<sup>st</sup> of March.

#### Sunlight to windows within the proposed development

The annual probable sunlight hours assessment has shown that, across all orientations, 62% of living/ kitchen and bedroom windows meet the recommended annual APSH values annually. Over the winter months, 71% compliance is achieved within living/kitchen & bedroom spaces.

An additional test has demonstrated that the majority of balconies within the development will achieve the recommended values within BRE Guidelines for amenity open spaces, with the majority of balconies receiving excellent levels of sunlight. It must be noted that BRE does not provide any guidance for balconies and this test has been carried out for information purpose only.

The calculation methodology for daylight and sunlight is based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition.

## DAYLIGHT & SUNLIGHT REPORT

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## 1. INTRODUCTION

OCSC have been appointed to carry out a Daylight/ Sunlight study for the Adamstown Blocks A, C & D development, located in Finnstown, Lucan, Co. Dublin.

The aim of the study is to record and analyse the results for the following:

- The daylight levels within the living and bedroom areas of selected apartments, to give an indication of the expected daylight levels throughout the proposed development;
- The expected sunlight levels within the living areas and bedrooms within the proposed development;
- The quality of amenity space, being provided as part of the development, in relation to sunlight;
- Any potential daylight impact the proposed development may have on properties adjacent to the site.

The calculation methodology for daylight and sunlight is based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition.



## 2. PROPOSED DEVELOPMENT

The proposed development consists of:

- A development to be constructed in 3 no. blocks (known as Block A, C and D) ranging in height from 2 to 9 storeys including an ancillary residents Pavilion Amenity Building;
- 436 no. apartments comprising 9 no. studio units, 204 no. 1-bedroom units, 213 no. 2-bedroom units and 10 no. 3-bedroom unit;
- Communal open space provided at podium and ground levels;
- 220 no. car parking spaces are to be provided in a mixture of on-street parking, podium and within the already permitted Block F multi-storey car park;
- The provision of 526 no. bicycle parking spaces provided through stacked (416 no. spaces) and Sheffield (110 no. spaces) bicycle parking spaces;
- The development also includes the provision of all ancillary site development and landscape works.

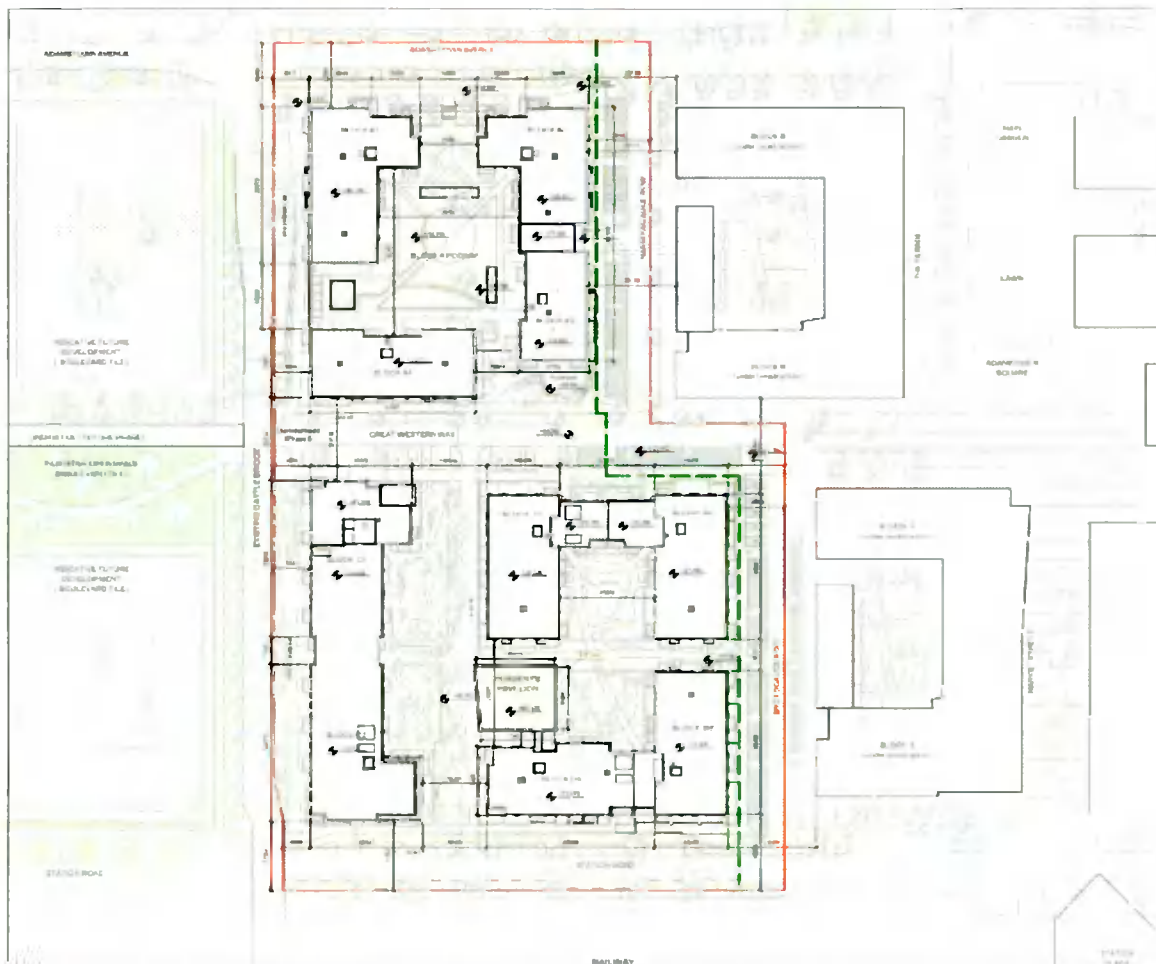


Figure 1: Proposed Site Plan



### 3. RELEVANT PLANNING POLICIES

The following planning policies have been used as a point of reference within the daylight and sunlight assessment for the proposed development:

#### **Relevant Planning Policy Number 1**

**The Sustainable Urban Housing: Design Standards for New Apartments – Guidelines for Planning Authorities (December 2020)** outlines that *“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.”* They also outline that *“where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraint associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.”*

#### **Relevant Planning Policy Number 2**

**The Sustainable Residential Development in Urban Areas, DoEHLG 2009** outlines that *“Overshadowing will generally only cause problems where buildings of significant height are involved or where new buildings are located very close to adjoining buildings. Planning authorities should require that daylight and shadow projection diagrams be submitted in all such proposals. The recommendations of ‘Site Layout Planning for Daylight and Sunlight: A Guide to good Practice’ (BRE 1991) or BS 8206 ‘Lighting for Buildings, Part 2 1992: Code of Practice for Daylighting’ should be followed in this regard.”*

### **Relevant Planning Policy Number 3**

**The Urban Development and Building Heights – Guidelines for Planning Authorities (December 2020)** outlines the following:

*“At the scale of the site/building:*

- The form, massing and height of proposed developments should be carefully modulated so as to maximise access to natural daylight, ventilation and views and minimise overshadowing and loss of light.*
- Appropriate and reasonable regard should be taken of quantitative performance approaches to daylight provision outlined in guides like the Building Research Establishment's 'Site Layout Planning for Daylight and Sunlight' (2nd edition) or BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'.*
- Where a proposal may not be able to fully meet all the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, in respect of which the planning authority or An Bord Pleanála should apply their discretion, having regard to local factors including specific site constraints and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.”*

#### 4. BRE GUIDELINES FOR DAYLIGHT AND SUNLIGHT

The analysis of the development's potential and the quality of amenity for the new development, as well as for the surrounding properties once the scheme has been implemented, has been based on the Building Research Establishment (BRE) guidelines on "Site Layout Planning for Daylight and Sunlight. A Guide to Good Practice (Building Research Establishment Report, 2011)."

These guidelines provide the criteria and methodology for calculations pertaining to daylight and sunlight, and is the primary reference for this matter. The guide gives simple rules for analysing sites where the geometry of the surroundings is straightforward, supplementing them with graphical methods for complex sites.

However, it is important to note that the performance targets which are included should be used with a degree of flexibility as per the extract below from the BRE Guide:

"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 the many factors in site layout design."

BRE Guidelines refers to BS 82061 "Lighting for Buildings, Part 2 1992: Code of Practice for Daylighting" for guidance on the recommended internal daylight levels.

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<sup>1</sup> The British Standard BS 8206: Part 2 (BS8206-02) has been withdrawn and replaced with IS EN 17037:2018 Daylight in Buildings. However, since the BRE Guidelines and some planning policy guidelines continue to make reference to the BS 8206, this standard has been used throughout the report.

## 5. PROPOSED BUILDING DESIGN

In order to ensure that daylight levels were maximised for the Adamstown development - Blocks A, C & D, a number of key design strategies were analysed during concept design.

### 5.1. BUILDING MATERIAL SELECTION

The selection of materials play an important role in ambient daylight levels. The façade of the proposed development has been carefully selected to promote a sense of brightness and light and is composed of light materials. This will ensure light is reflected throughout the development. The inclusion of greenery to the amenity spaces will help to improve the sense of light and brightness within the apartments.

## 5.2. GLAZING TO WALL RATIO

The primary function of the glazing to wall ratio is to maximize daylight within the space while reducing solar gains within the proposed development. The other advantage in conjunction with appropriate materials is that the more light coloured, reflective materials used externally, the more ambient daylight will be reflected to the surrounding areas.

In addition, high floor to ceiling heights further enhance the opportunity for improved daylight levels. Extensive analysis was undertaken on all building facades to ensure glazing widths were maximized to promote access to daylight. The image below illustrates the glazing to wall ratio of the proposed development.



Figure 2: Block D North Elevation Glazing to Wall Ratio

## 6. DAYLIGHT LEVELS WITHIN THE PROPOSED DEVELOPMENT

### 6.1. ASSESSMENT CRITERIA – INTERNAL DAYLIGHT

The method of calculation selected for the internal daylight analysis for this development is the Average Daylight Factor (ADF). This is the most detailed and thus most accurate method which considers not only the amount of sky visible from the vertical face of the window, but also the window size, room size and room use.

Architectural plans and elevations provided by Henry J Lyons Architects formed the basis for the internal daylight assessment.

In order to quantify the quality of daylight within a space as per BRE Guidelines, the British standards BS8206 sets out minimum daylight factors to be achieved in new build residential units.

Room type	Minimum average daylight factor %
Bedrooms	1
Living rooms	1.5
Kitchens	2

Where one room serves more than one purpose, the minimum average daylight factor should be that for the room type with the highest value. For example, in a space which combines a living room and a kitchen the minimum average daylight factor should be 2%.

Figure 3: BS 8206 – Table 2

BS 8206 outlines that for a room that serves more than one purpose, the minimum ADF should be that for the room type with the highest value. For example, in a combined living/kitchen spaces, the minimum recommended ADF value should be 2%.

In order to analyse the daylight requirements for the development a detailed 3D model was constructed of the entire development, in the Integrated Environmental Solutions Virtual Environment (IES VE) software package. A number of computer simulations were then undertaken in the IES VE software package to ascertain the ADFs achieved within the dwellings of the proposed development.



## 6.2. DAYLIGHT RESULTS – INTERNAL DAYLIGHT APARTMENTS

This section outlines the rooms that were selected for assessment of internal daylight levels for the proposed Adamstown Development - Blocks A, C & D. The results of the analysis are outlined in the accompanying tables.

In line with common industry approach, units presented at the lower levels have been selected for analysis. Units are selected at the lower levels on the basis that they will receive the lowest levels of daylight due to their location, obstruction and position within the development. Another factor in unit selection is the layout of the apartment. Room depth and location of balconies also play an important role when it comes to daylight penetration within the room. Different types of rooms across the lower levels have been analysed, prioritizing the deep plan and more obstructed rooms.

The daylight analysis is completed within the IES software and all room results are tabulated. Where a room ADF result falls short of the compliance benchmark, the same apartment type directly above is also modelled to show if that room achieves the compliance benchmark in the above level. This process is reiterated on each level above until the compliance benchmark is achieved. Where units at the lower level achieve the compliance benchmark, it is taken that the same unit type directly above will also achieve the compliance benchmark and therefore, no further modelling is required. The only exception is between ground and first floor levels, due to the usual reduction on the floor to ceiling height of the first floor level in comparison to the ground, a reduction on the daylight levels could be experienced.

Figure 4-11 illustrate an example of the rationale applied to calculate the percentage rate of compliance based on a sample of analysed rooms. The rooms identified with a text reference (A, B, C etc.) were selected for analysis. The results recorded for the assessed rooms will show as a pass or fail against the compliance benchmark. This pass or fail result is then applied to rooms with similar characteristics (room configuration, location or level of obstructions).

The design and layout of each apartment type has been carefully considered with generous window openings being provided. Where the opportunity arises, rooms have been designed as dual aspect and bathroom and storage areas have been provided to the back of apartments to give living spaces greater access to daylight.

Therefore, across the 1,105 rooms in the scheme the design team are confident that a compliance rate of  $\geq 95\%$  is achieved across the development.

The surface reflectance values outlined in Table 1 have been used in the analysis.

Surface Type	Reflectance (%)
External Wall	40
Internal Partitions	70
Ceiling	40
Floor	40
Adjacent Buildings	30
Glazing Transmittance	70

Table 1: Surface Reflectance Values

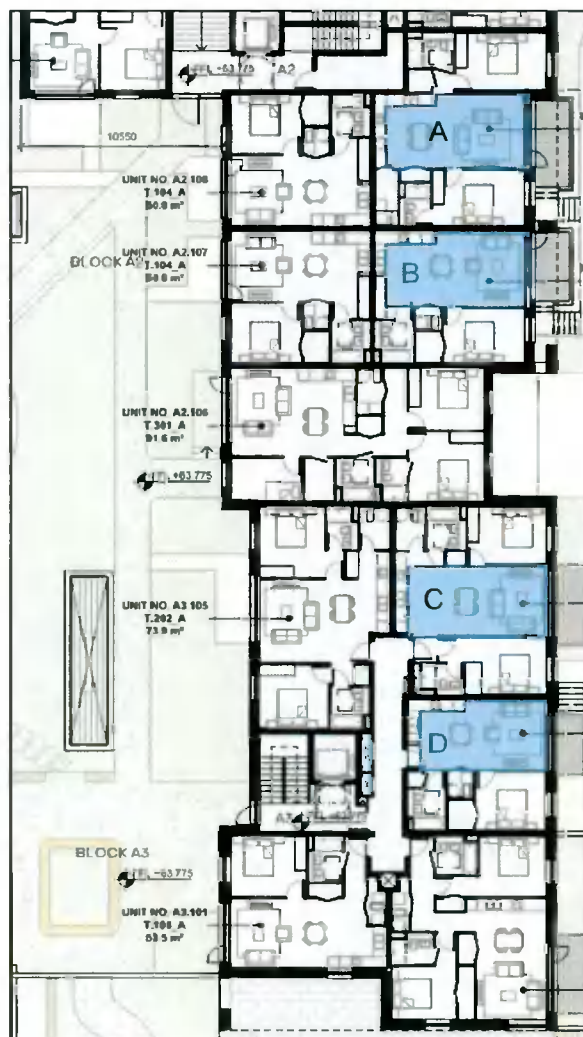


Figure 4: Block A – First Floor (East) Assessed Rooms Highlighted in Blue

Unit	ADF required (%)	ADF results (%)	Meets minimum ADF criteria
A Living/ Kitchen	2.0%	2.0%	Y
B Living/ Kitchen	2.0%	2.6%	Y
C Living/ Kitchen	2.0%	2.9%	Y
D Living/ Kitchen	2.0%	3.3%	Y

Table 2: Average Daylight Factor Results – Block A – First Floor (East) Assessed Rooms



Figure 5: Block A – First Floor (South) Assessed Rooms Highlighted in Blue

Unit	ADF required (%)	ADF results (%)	Meets minimum ADF criteria
A Living/ Kitchen	2.0%	3.6%	Y
B Living/ Kitchen	2.0%	4.1%	Y

Table 3: Average Daylight Factor Results – Block A - First Floor (South) Assessed Rooms

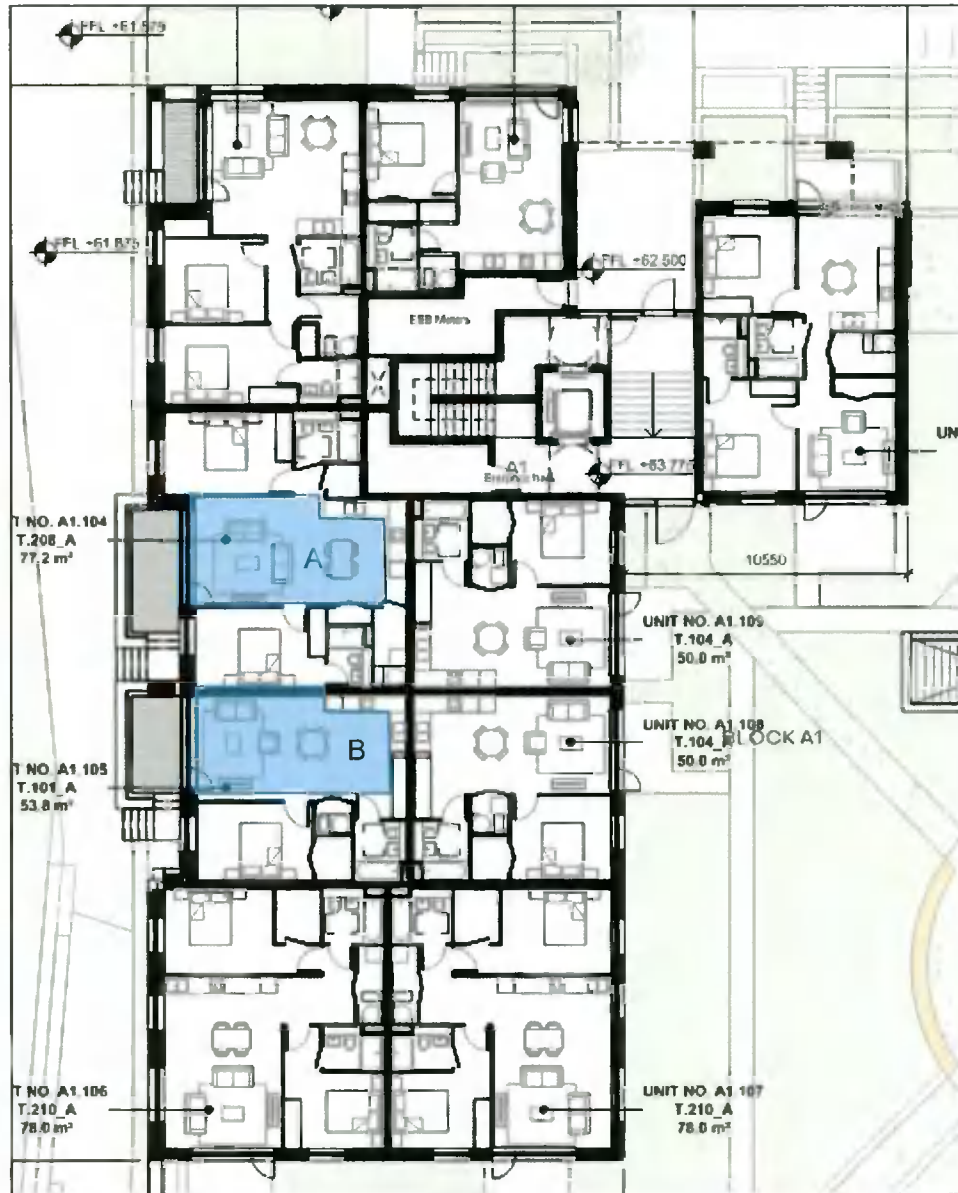


Figure 6: Block A – First Floor (West) Assessed Rooms Highlighted in Blue

Unit	ADF required (%)	ADF results (%)	Meets minimum ADF criteria
A Living/ Kitchen	2.0%	3.0%	Y
B Living/ Kitchen	2.0%	3.5%	Y

Table 4: Average Daylight Factor Results – Block A – First Floor (West) Assessed Rooms





Figure 7: Block C - First Floor (North) Assessed Rooms Highlighted in Blue

Unit	ADF required (%)	ADF results (%)	Meets minimum ADF criteria
A Bedroom	1.0%	4.2%	Y
B Living/ Kitchen	2.0%	3.9%	Y
C Living/ Kitchen	2.0%	3.0%	Y

Table 5: Average Daylight Factor Results – Block C – First Floor (North) Assessed Rooms



Figure 8: Block D – Ground Floor (North) Assessed Rooms Highlighted in Blue

Unit	ADF required (%)	ADF results (%)	Meets minimum ADF criteria
A Living/ Kitchen	1.5%	3.9%	Y
B Living/ Kitchen	2.0%	2.7%	Y
C Living/ Kitchen	2.0%	3.2%	Y
D Living/ Kitchen	2.0%	2.5%	Y
E Bedroom	1.0%	1.0%	Y

Table 6: Average Daylight Factor Results – Block D – Ground Floor (North) Assessed Rooms



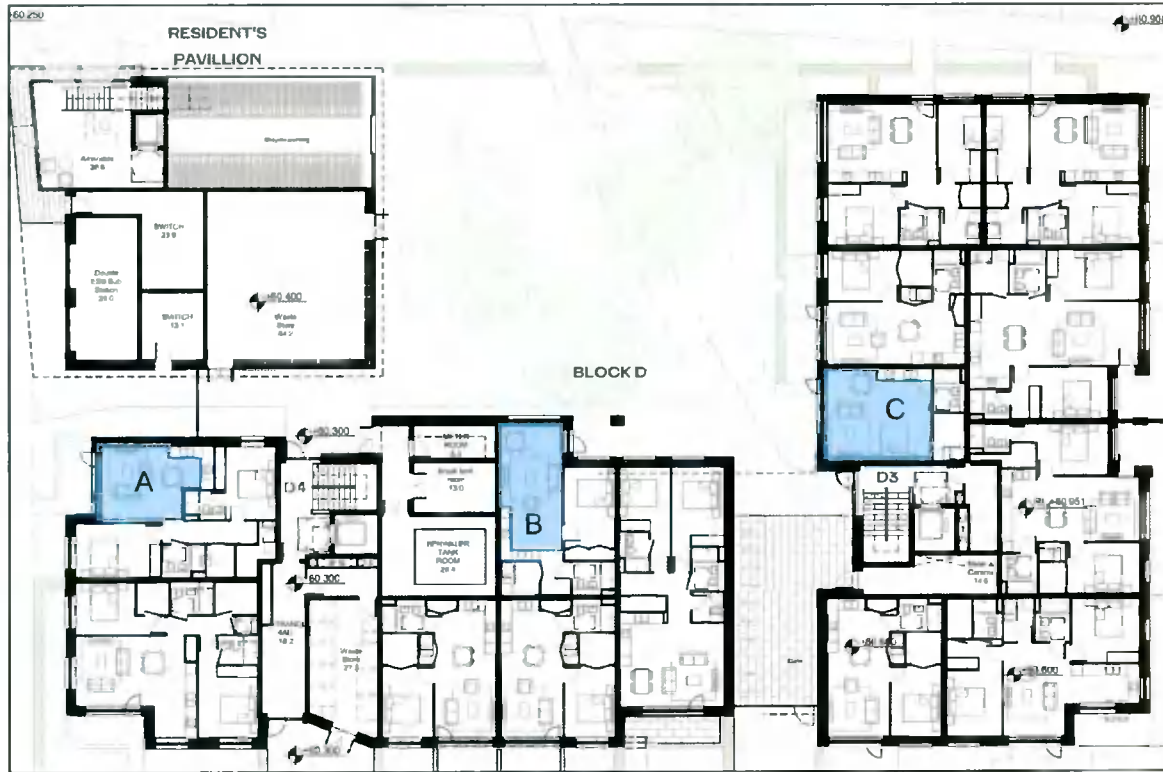


Figure 9: Block D – Ground Floor (South) Assessed Rooms Highlighted in Blue

Unit	ADF required (%)	ADF results (%)	Meets minimum ADF criteria
A Living/ Kitchen	2.0%	3.6%	Y
B Living/ Kitchen	2.0%	4.0%	Y
C Living/ Kitchen	2.0%	3.4%	Y

Table 7: Average Daylight Factor Results – Block D – Ground Floor (South) Assessed Rooms



Figure 10: Block D – First Floor (North) Assessed Rooms Highlighted in Blue

Unit	ADF required (%)	ADF results (%)	Meets minimum ADF criteria
A Living/ Kitchen	2.0%	2.3%	Y
B Living/ Kitchen	2.0%	2.0%	Y
C Living Room	1.5%	2.5%	Y
D Living/ Kitchen	2.0%	2.4%	Y
E Living/ Kitchen	2.0%	2.9%	Y

Table 8: Average Daylight Factor Results – Block D - First Floor (North) Assessed Rooms



Figure 11: Block D - First Floor (South) Assessed Rooms Highlighted in Blue

Unit	ADF required (%)	ADF results (%)	Meets minimum ADF criteria
A Living/ Kitchen	2.0%	2.4%	Y
B Living/ Kitchen	2.0%	2.2%	Y

Table 9: Average Daylight Factor Results – Block D - First Floor (South) Assessed Rooms

Where units at the lower level achieve the compliance benchmark, it is taken that the similar unit types directly above will also achieve the compliance benchmark as daylight levels increase as high does too and therefore, no further modelling is required.

Total No. of Rooms	No. Living/ Kitchen /Studio Rooms Not Compliant with BS 8206 Guidelines (2.0% ADF)	No. Bedrooms Not Compliant with BS 8206 Guidelines (1.0% ADF)	Total No. Rooms Not Compliant with BS 8206 Guidelines	% of compliance with BS 8206, across entire development
1,105	0	0	0	≥95%

Table 10: Percentage of Compliance

## 7. SUNLIGHT ASSESSMENT TO AMENITY SPACES WITHIN THE DEVELOPMENT

BRE Guidelines (2011) recommend that for external amenity spaces to appear adequately sunlit throughout the year, at least half of the garden or amenity space should receive at least two hours of sunlight on March 21<sup>st</sup>.

In order to show that sunlight levels within the development achieve compliance with current BRE Guidelines a sunlight study has been carried out for the proposed development.

The red squares in Figure 12 illustrate the areas that receive a minimum of 2 hours of sunlight on the 21<sup>st</sup> of March for Block A in the proposed development. As shown below, the vast majority of the communal amenity spaces receive 2 hours or more of sunlight on March 21<sup>st</sup>. Therefore, compliance with BRE Guidelines is achieved.

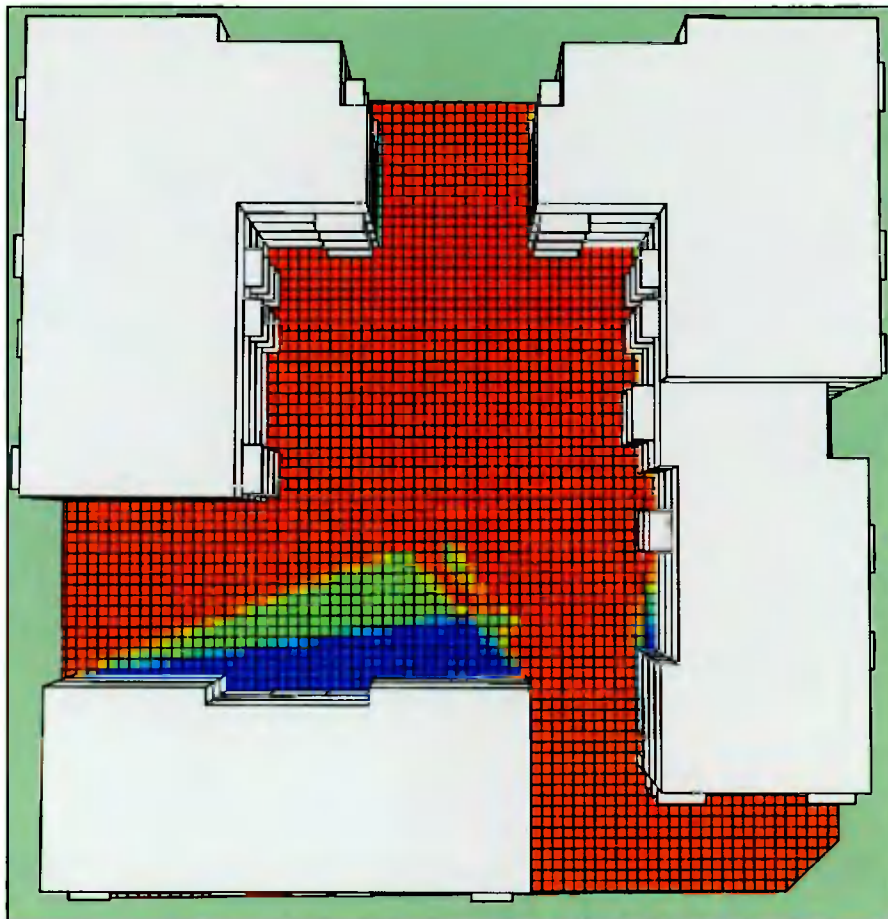


Figure 12: Amenity Spaces Block A - Hours of Sunlight on March 21<sup>st</sup>



The red squares in Figure 13 illustrate the areas that receive a minimum of 2 hours of sunlight on the 21<sup>st</sup> of March for Blocks C & D in the proposed development. As shown below, the vast majority of the communal amenity spaces receive 2 hours or more of sunlight on March 21<sup>st</sup>. Therefore, compliance with BRE Guidelines is achieved. Although there is an area of the Block D courtyard which will receive <2 hours of sunlight on 21<sup>st</sup> March, much of this lost sunlight is due to the building to the east of this courtyard and will be lost in the morning. This area will still receive significant sunlight in the evenings.

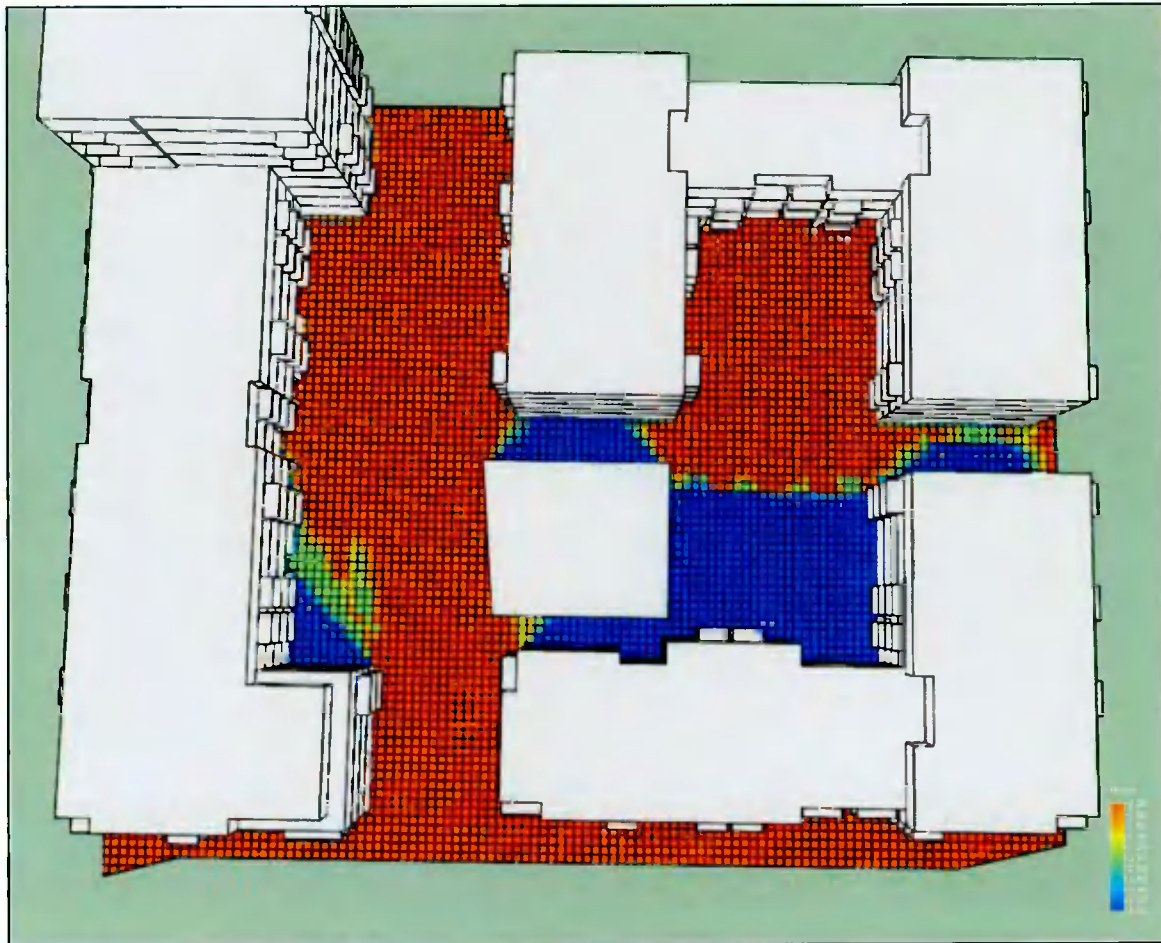


Figure 13: Amenity Spaces Blocks C & D - Hours of Sunlight on March 21<sup>st</sup>

The excellent daylight and sunlight access can also be attributed to the sunlight reflection from the building facades that have been carefully designed with light materials, thus creating comfortable and desirable spaces for the residents.

Even though BRE Guidelines does not give specific recommendations for balconies, they have been assessed against the benchmark for open amenity spaces. The red squares in the following figures

highlight the areas that receive a minimum of 2 hours of sunlight on March 21<sup>st</sup> for the balconies within the development.

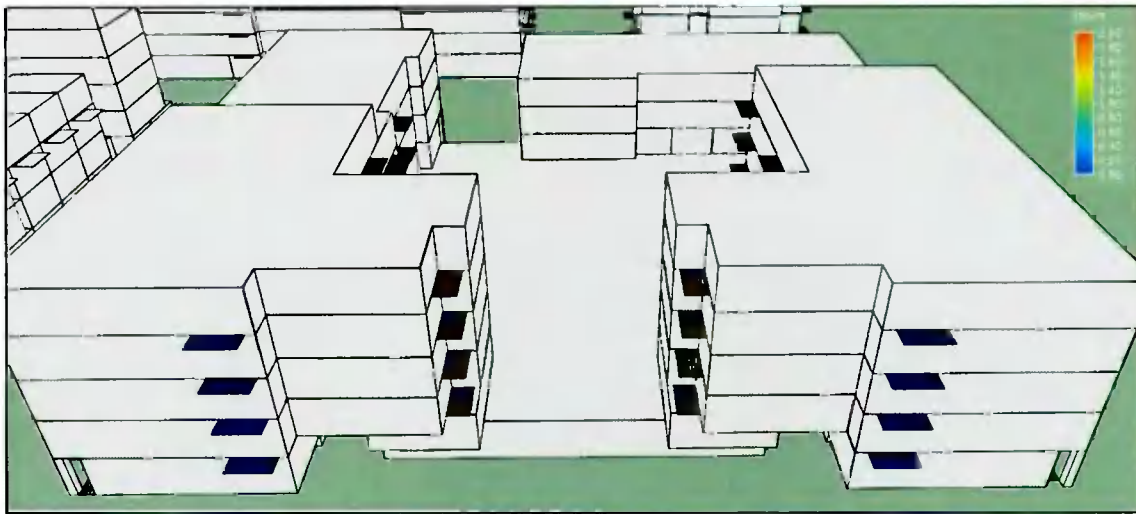


Figure 14: Block A North Elevation – March 21<sup>st</sup>

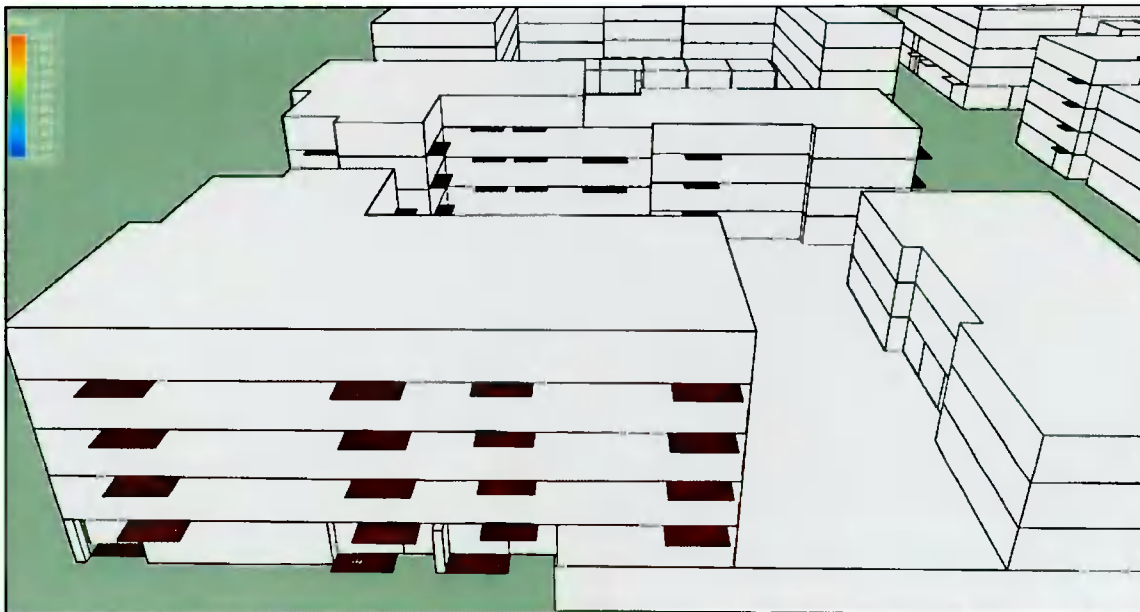


Figure 15: Block A West Elevation – March 21<sup>st</sup>



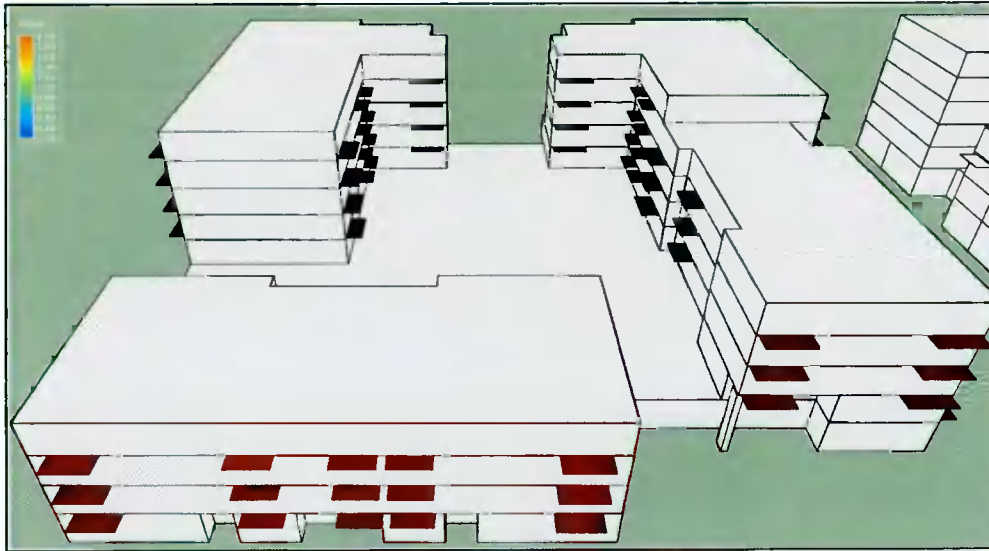


Figure 16: Block A South Elevation – March 21<sup>st</sup>

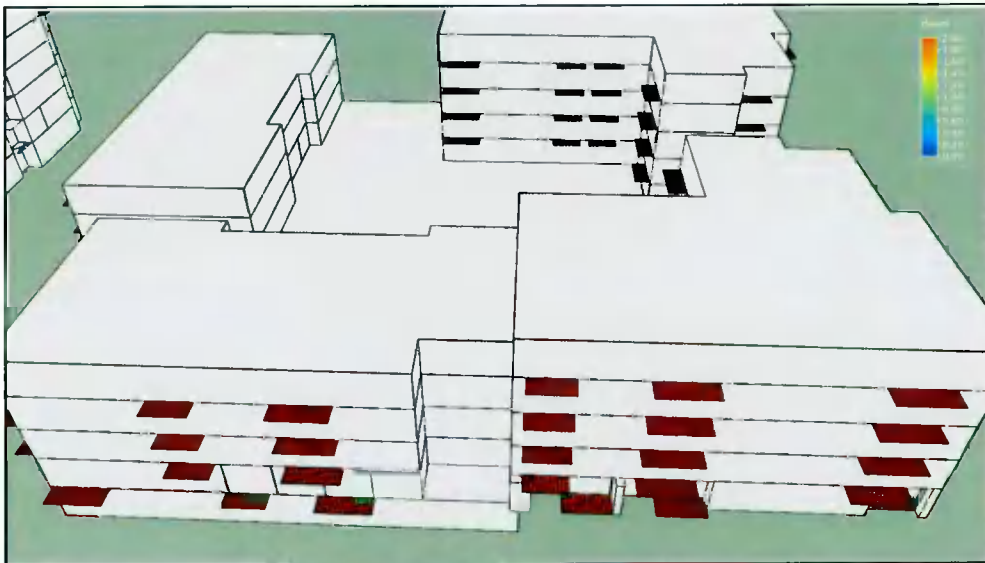


Figure 17: Block A East Elevation – March 21<sup>st</sup>

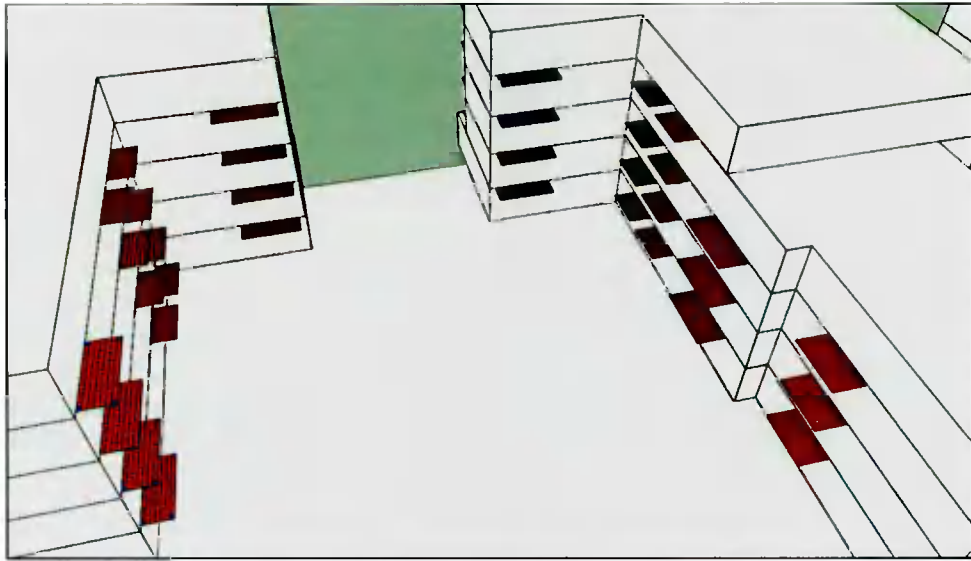


Figure 18: Block A - Courtyard - March 21<sup>st</sup>

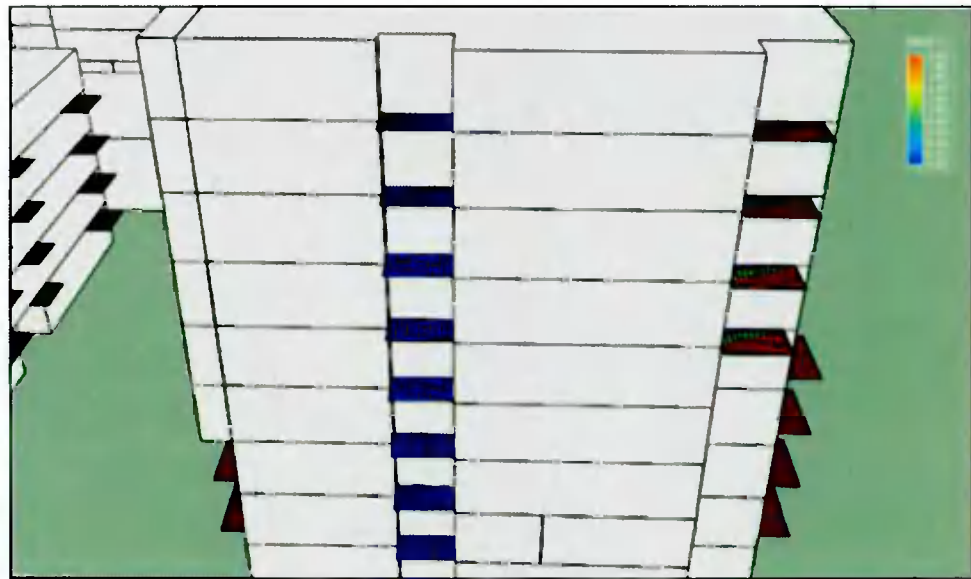


Figure 19: Block C North Elevation - March 21<sup>st</sup>

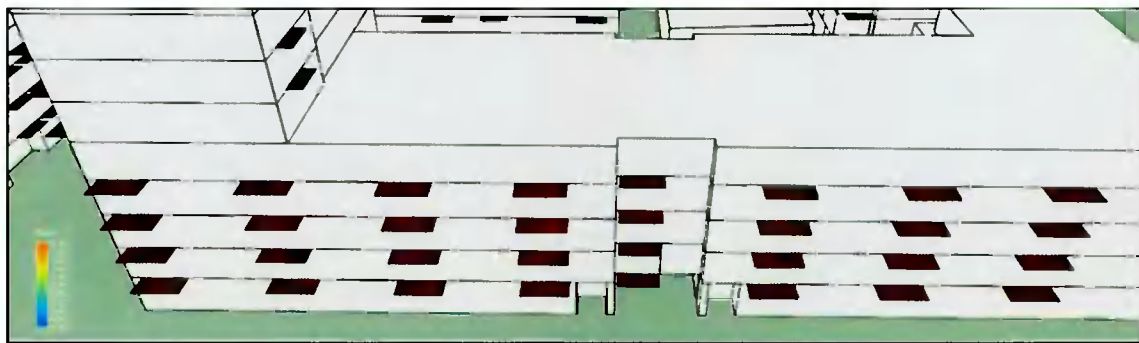


Figure 20: Block C West Elevation - March 21<sup>st</sup>

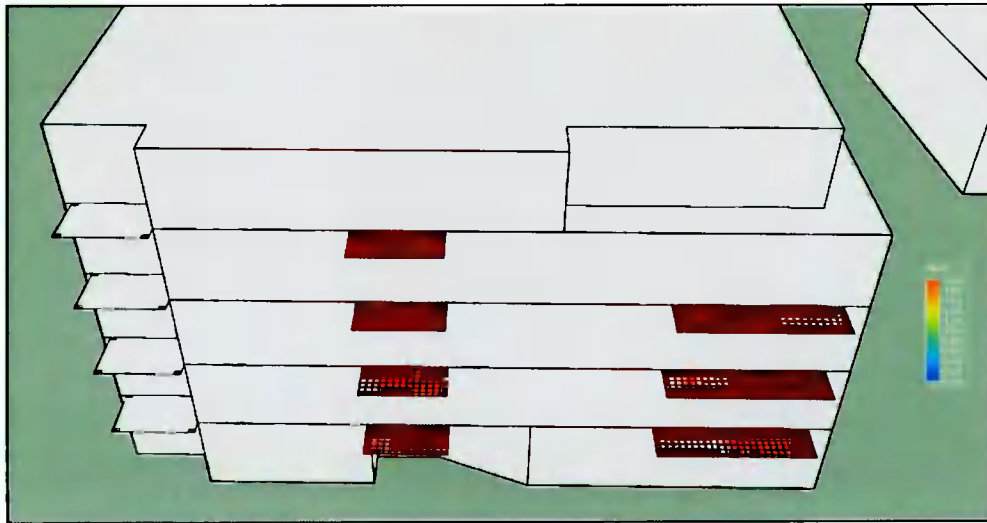


Figure 21: Block C South Elevation – March 21<sup>st</sup>

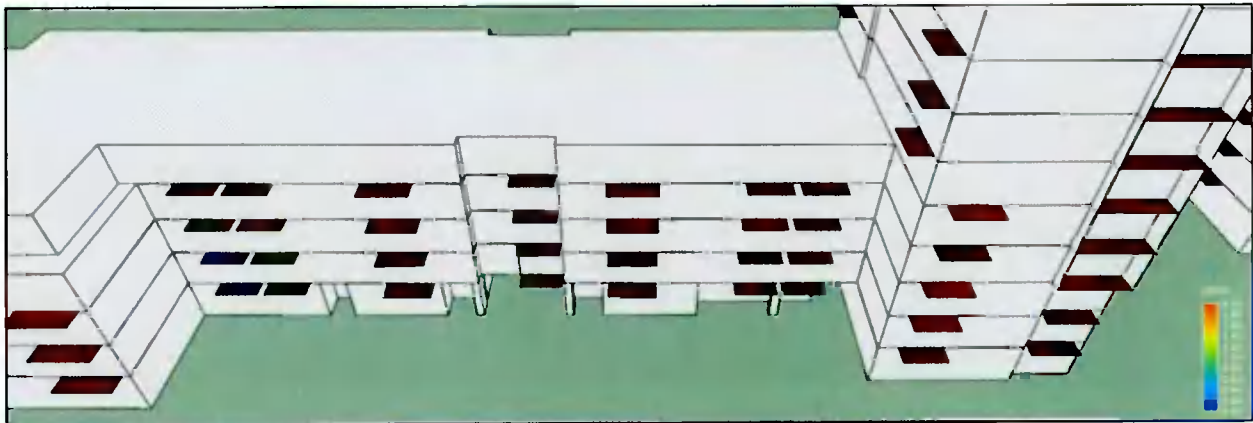


Figure 22: Block C East Elevation – March 21<sup>st</sup>

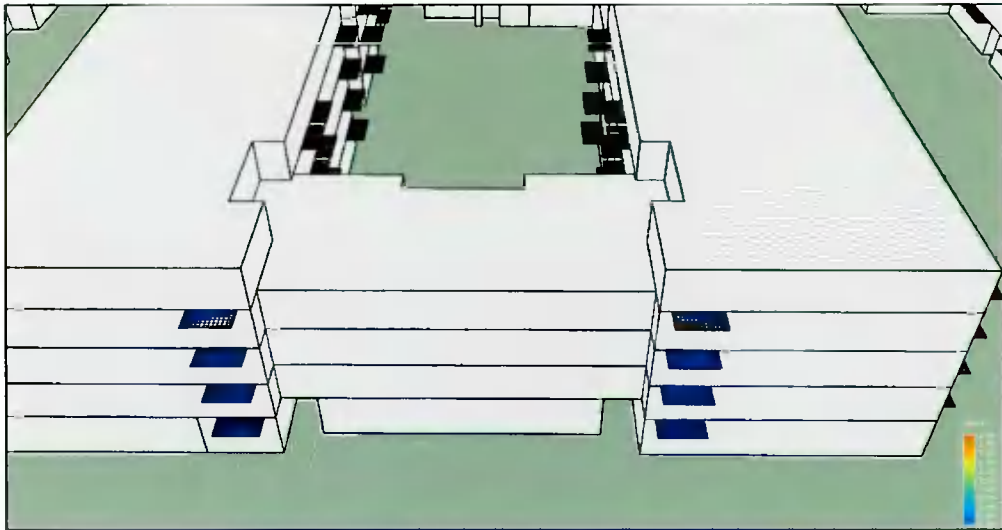


Figure 23: Block D North Elevation – March 21<sup>st</sup>

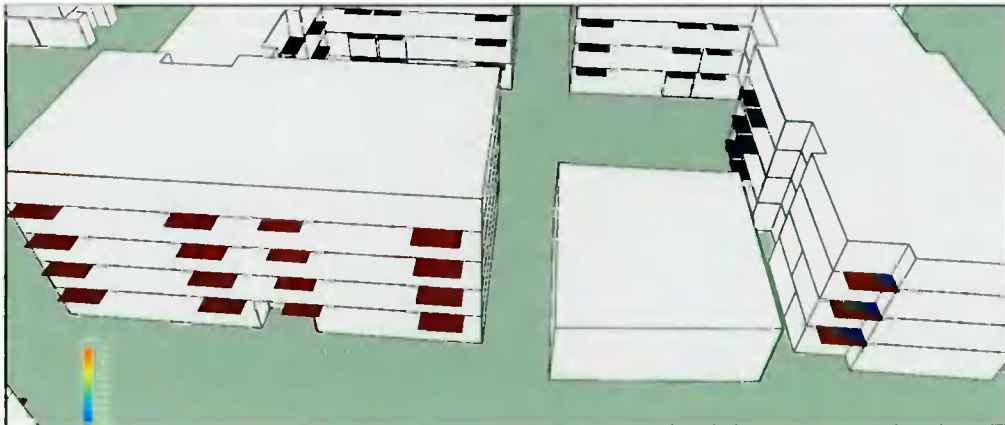


Figure 24: Block D West Elevation – March 21<sup>st</sup>

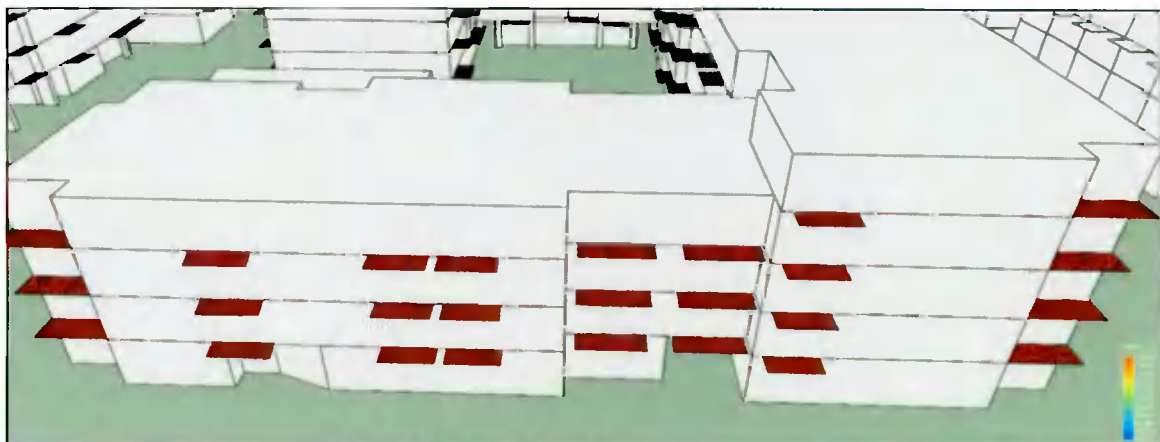


Figure 25: Block D South Elevation – March 21<sup>st</sup>

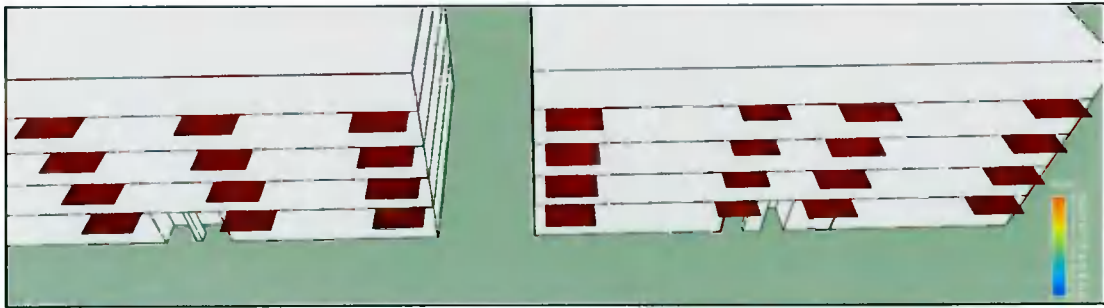


Figure 26: Block D East Elevation – March 21<sup>st</sup>

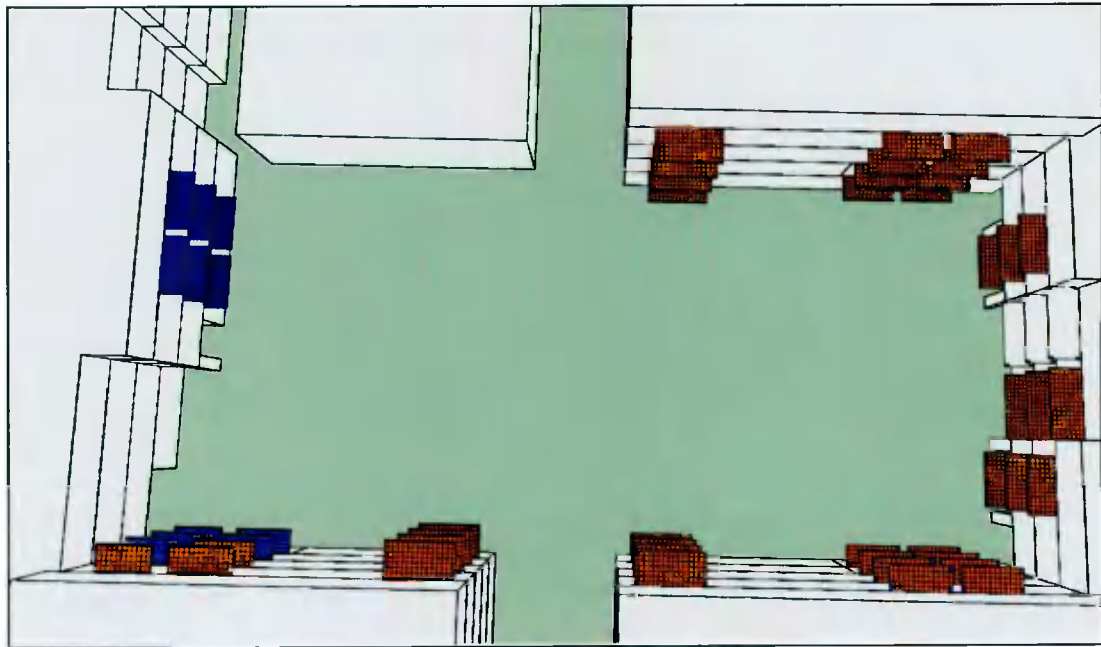


Figure 27: Block D Courtyard – March 21<sup>st</sup>



## 8. SUNLIGHT ASSESSMENT WITHIN THE PROPOSED DEVELOPMENT (APSH)

In order to determine the amount of sunlight that is received by windows within the proposed development, the Annual Probable Sunlight Hours (APSH) calculation method as outlined in BRE Guidelines has been used.

BRE Guidelines outline that in housing, the main requirement for sunlight is in living rooms, where it is valued at any time of the day but especially in the afternoon. BRE Guidelines also state that sunlight is less important in bedrooms and kitchens. However, for added clarity, all windows to occupied rooms within the development have been included within the analysis.

The recommendation set out in BRE Guidelines state that in order to show that adequate sunlight reaches windows within occupied rooms, the centre of at least one window to a main living room must receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months between 21<sup>st</sup> September and 21<sup>st</sup> March.

While the BRE criteria sets out these recommendations for living room windows receiving direct sunlight throughout the year, it contradicts the guidance set out in the Design Standards for New Apartments. This apartment design guidance document states that balconies should adjoin and have a functional relationship with the main living areas of the apartment. They also state that it is preferable that balconies would be primarily accessed from living rooms.

As the location of balconies have been designed to primarily comply with the apartment design guidelines, the amount of sunlight reaching these living room and bedroom space windows at lower floors will naturally be reduced and achieving the recommended values within BRE Guidelines can become challenging.

The below table summarises the annual probable sunlight hours for the annual period and for the winter period based on the BRE recommendations.



	BRE Guidelines Check 1	BRE Guidelines Check 2
	APSH > 25%	APSH > 5%
	Annual Period	Winter Period
<b>Percentage of Compliance</b>	62 %	71 %

Table 11: APSH Summary Table – All Living/ Kitchen areas and Bedroom Spaces

The annual probable sunlight hours assessment has shown that, across all orientations, 62% of living/ kitchen and bedroom windows meet the recommended annual APSH values annually. Over the winter months, 71% compliance is achieved within living/kitchen & bedroom spaces.

It must be noted that the results within this report should be treated with certain degree of flexibility, based on the following statement in the BRE Guidelines:

*“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 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 addition, BS-8206 states that *“the degree of satisfaction is related to the expectation of sunlight. If a room is necessarily north facing or if the building is in a densely-built urban area, the absence of sunlight is more acceptable than when its exclusion seems arbitrary”.*

The following images illustrate the sunlight levels achieved within the proposed development across all elevations.

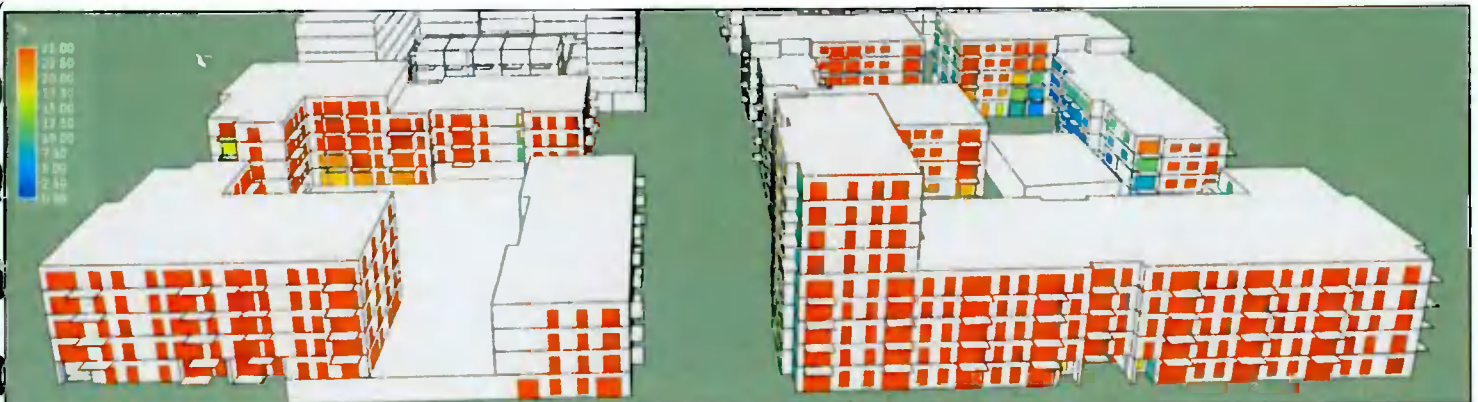


Figure 28: Annual Probable Sunlight Hours – West Elevation

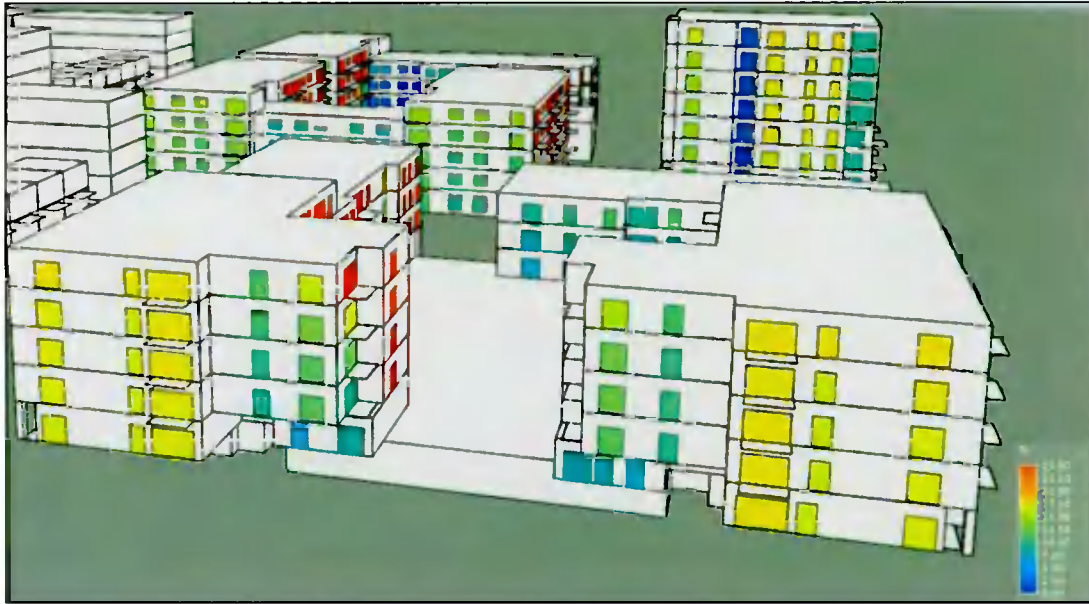


Figure 29: Annual Probable Sunlight Hours – North Elevation



Figure 30: Annual Probable Sunlight Hours – East Elevation

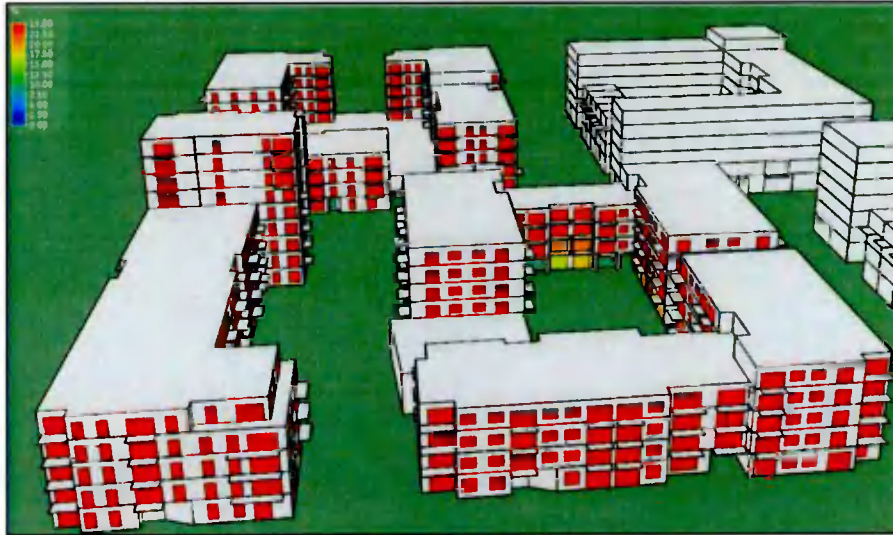


Figure 31: Annual Probable Sunlight Hours – South Elevation

## 9. ASSESSING THE IMPACT ON SURROUNDING PROPERTIES

### 9.1. DAYLIGHT IMPACT METHODOLOGY

As per the BRE Guidelines, it is important to safeguard the daylight to nearby buildings, from a proposed development, where a reasonable expectation of daylight is required. The flow matrix below outlines the criteria to be assessed, as per the BRE Guidelines, in order to ascertain any potential impact to adjacent buildings from the proposed development.

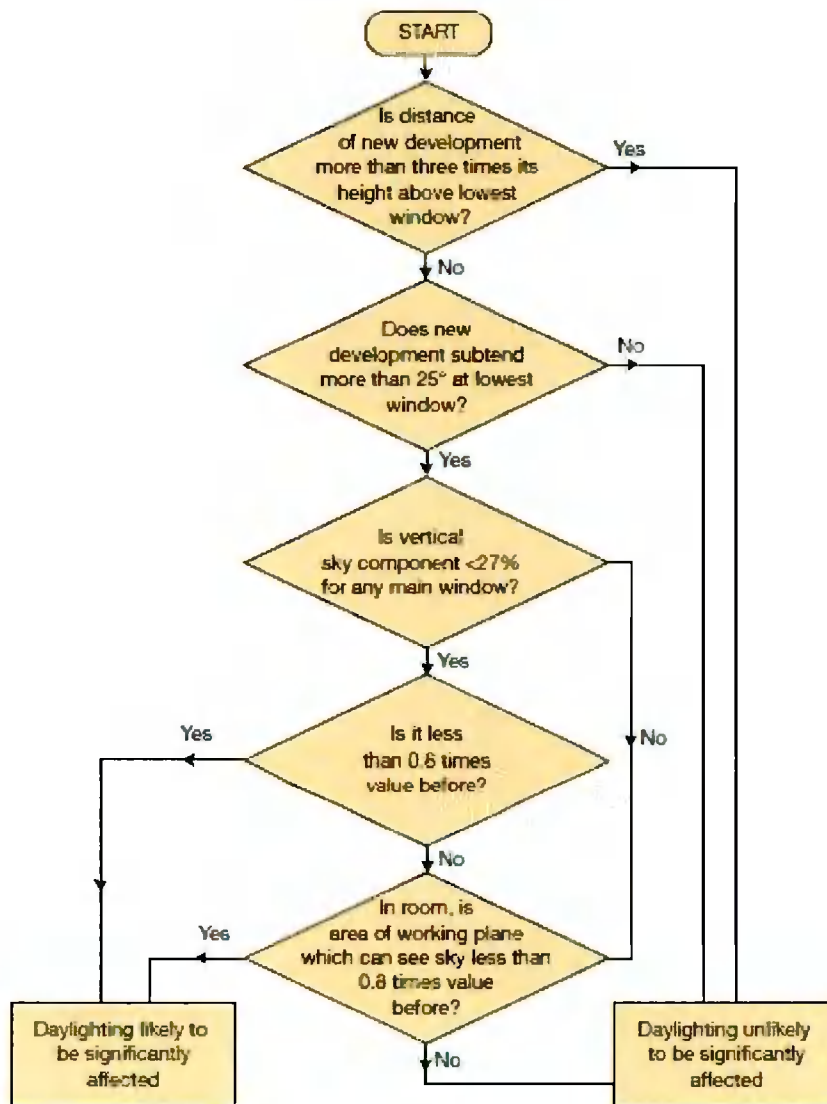


Figure 32: Daylight Assessment Methodology



As per the flow matrix, the BRE and BS-8206 guidelines provide four main methods for assessing daylight availability. In order to assess the impact of the proposed Adamstown Blocks A, C & D development to surrounding buildings, the 25° line and the Vertical Sky Component were selected as the method of analysis.

## 9.2. 25° LINE CRITERIA

In the first instance, if a proposed development falls beneath a 25° angle taken from a point 1.6 metres above ground level from any adjacent properties, then the BRE Guidelines say that no further analysis is required in relation to impact on surrounding properties as adequate skylight will still be available.

## 9.3. VERTICAL SKY COMPONENT

The second method is known as the Vertical Sky Component (VSC). The VSC calculation is the ratio of the direct sky illuminance falling on the outside of a window, to the simultaneous horizontal illuminance under an unobstructed sky. The BRE Guide sets out two guidelines for the VSC analysis:

- If the VSC at the centre of the existing window exceeds 27% with the new development in place, then enough sky light should still be reaching the existing window;
- If the VSC with the new development in place is both less than 27% and less than 80% its former value, then the reduction in light to the window is likely to be noticeable;
- This means that even if the VSC is less than 27%, as long as the VSC value is still greater than 80% of its former value, this would be acceptable and thus the impact would be considered negligible.

It is important to note that the VSC is a simple geometrical calculation which provides an early indication of the potential for daylight entering the space. However, it does not assess or quantify the actual daylight levels inside the rooms. If the VSC standard is not met on any window, a more detailed assessment based on the Average Daylight Factor should be undertaken.

As the 25° line and the methods showed compliance, this step was not used as part of the analysis.



The image below identifies the location of the sensitive receptors.



Figure 33: Location of Sensitive Receptor

## 9.7. DAYLIGHT IMPACT ON SURROUNDING PROPERTIES

### 25° line

BRE Guidelines state that if a proposed development falls beneath a 25° line taken from a point 1.6 metres above ground level from any adjacent properties, then no impact is perceived and further analysis is not required.

The image below highlights in red the 25° line created. The no sensitive receptors fall inside the 25° line, therefore no further analysis is required.

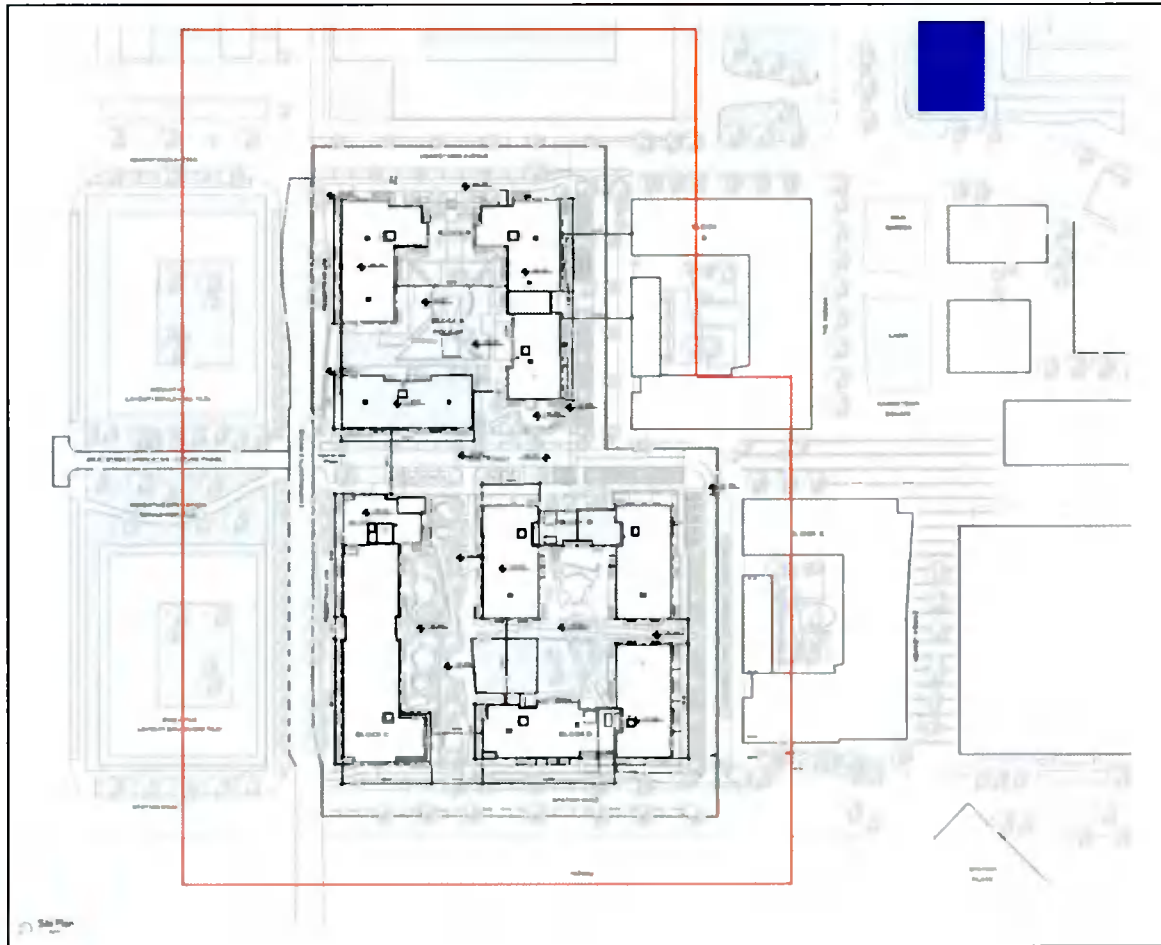


Figure 34: 25° Line Criteria

## 10. SUNLIGHT IMPACT ON ADJACENT PROPERTIES (APSH)

In order to assess the sunlight access within the adjacent properties of Adamstown Development – Blocks A, C & D the Annual Probable Sunlight Hours (APSH) have been analysed.

BRE Guidelines outline that 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 sunlight of the existing dwelling may be adversely affected (refer to Figure 35).

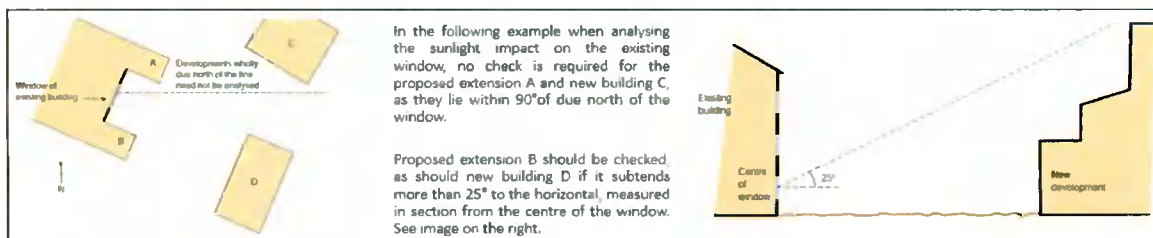


Figure 35: BRE Extract of the methodology for rooms selection - APSH

The sunlight within adjacent properties may be adversely affected if the center of the window:

- Receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between September 21<sup>st</sup> and March 21<sup>st</sup>;
- Receives less than 80% its former sunlight hours during either period;
- Has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

Since all adjacent properties outside of the Adamstown Development fall outside the 25° line, it can be stated that they are located to substantial distance from the proposed development. Therefore, no impact on any of the surrounding properties will be perceived.

## 11. OVERSHADOWING IMPACT TO SURROUNDING PROPERTIES

BRE Guidelines state that *“if a space is used all year round, the equinox (March 21<sup>st</sup>) is the best date for which to prepare shadow plots as it gives an average level of shadowing. Lengths of shadows at the autumn equinox (September 21<sup>st</sup>) will be the same as those for March 21<sup>st</sup>, so a separate set of plots for September is not required. However, clock times for September will be one hour later, because British Summer Times (BST)”*.

Based on the recommendations within the BRE Guidelines, March 21<sup>st</sup> has been used to create the overshadowing images. In addition, overshadowing images for June and December 21<sup>st</sup> have also been created to give an indication of the sunlight levels that will be received during the summer and winter months.

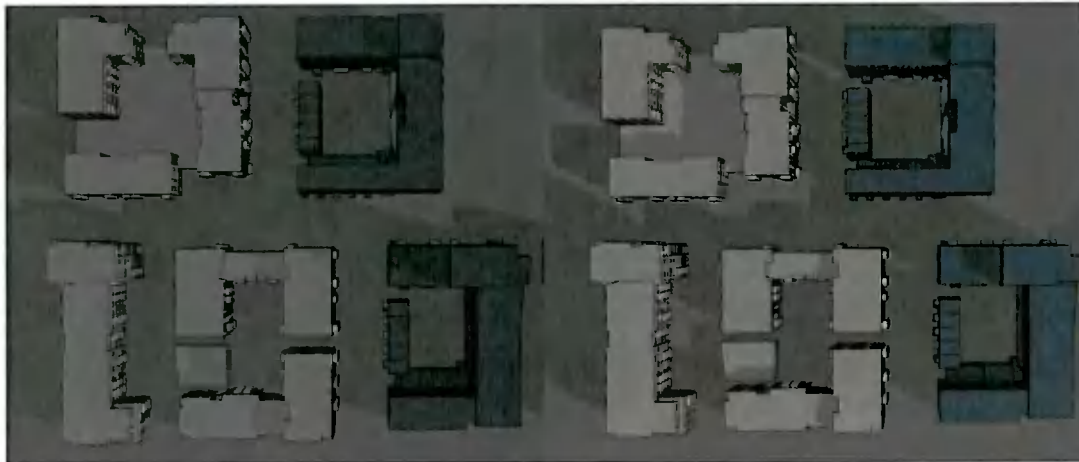


Figure 36: Overshadowing Images on March 21<sup>st</sup> at 8 a.m. and 9 a.m.

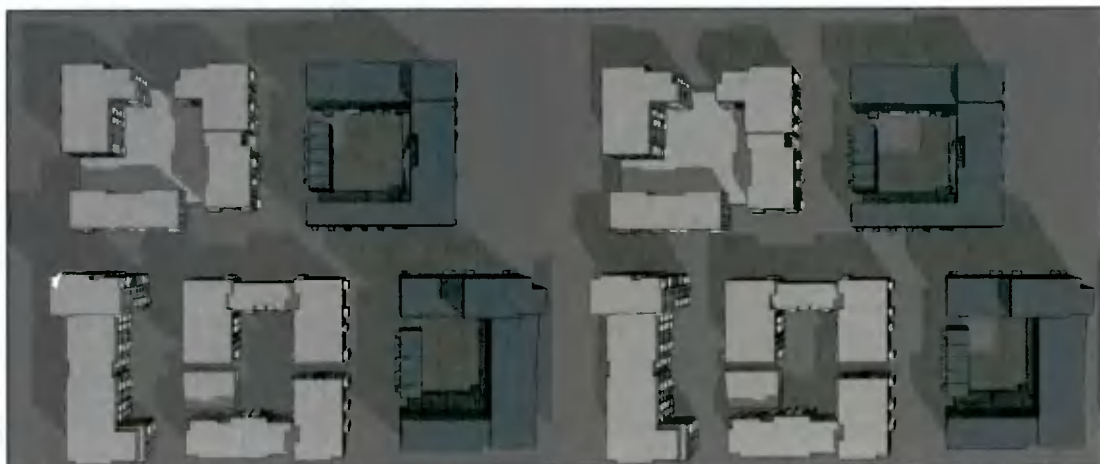


Figure 37: Overshadowing Images on March 21<sup>st</sup> at 10 a.m. and 11 a.m.



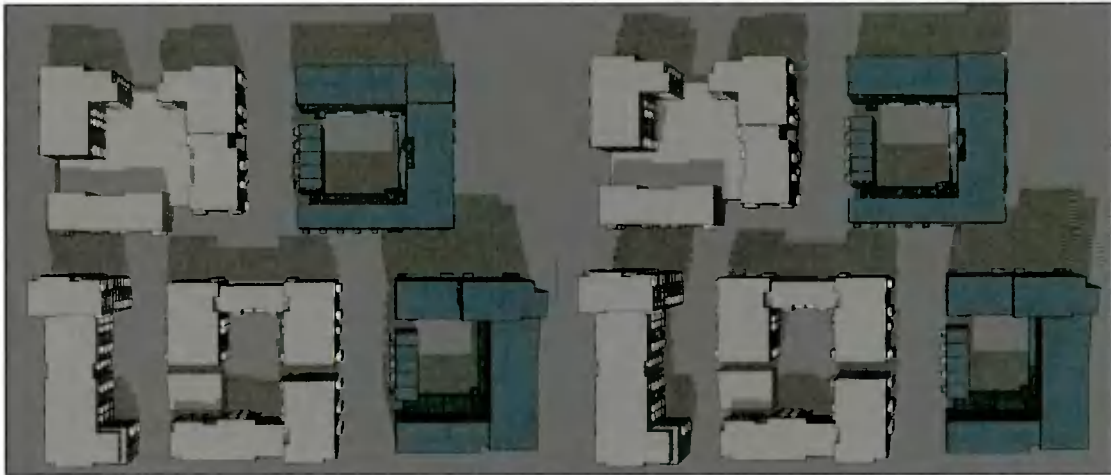


Figure 38: Overshadowing Images on March 21<sup>st</sup> at 12 p.m. and 1 p.m.

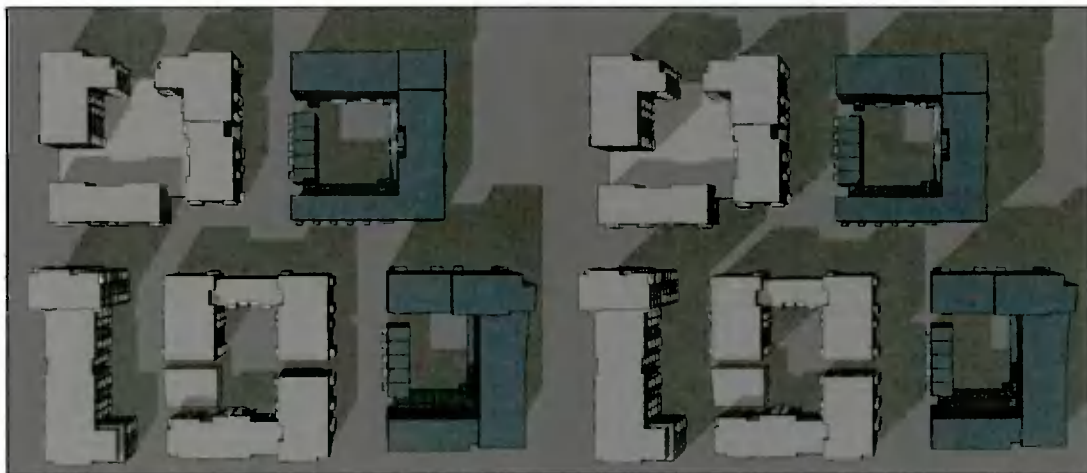


Figure 39: Overshadowing Images on March 21<sup>st</sup> at 2 p.m. and 3 p.m.

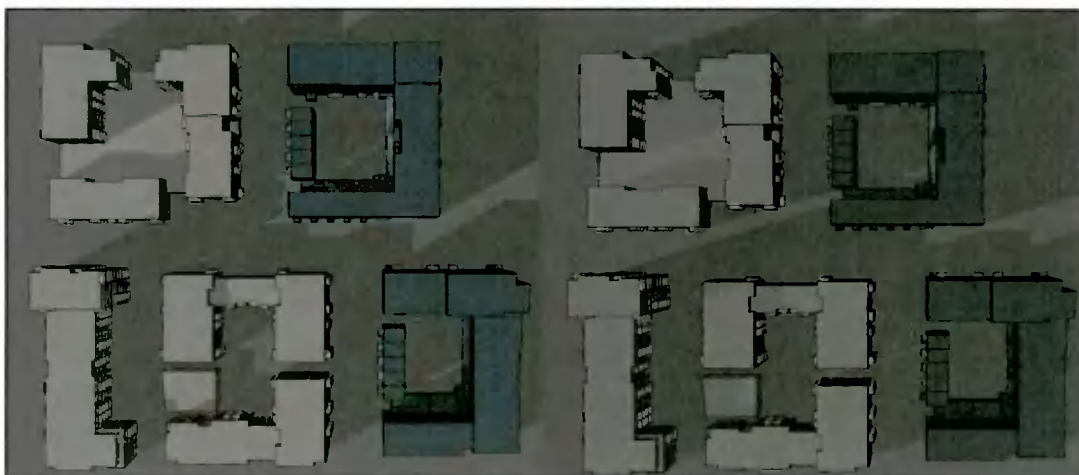


Figure 40: Overshadowing Images on March 21<sup>st</sup> at 4 p.m. and 5 p.m.



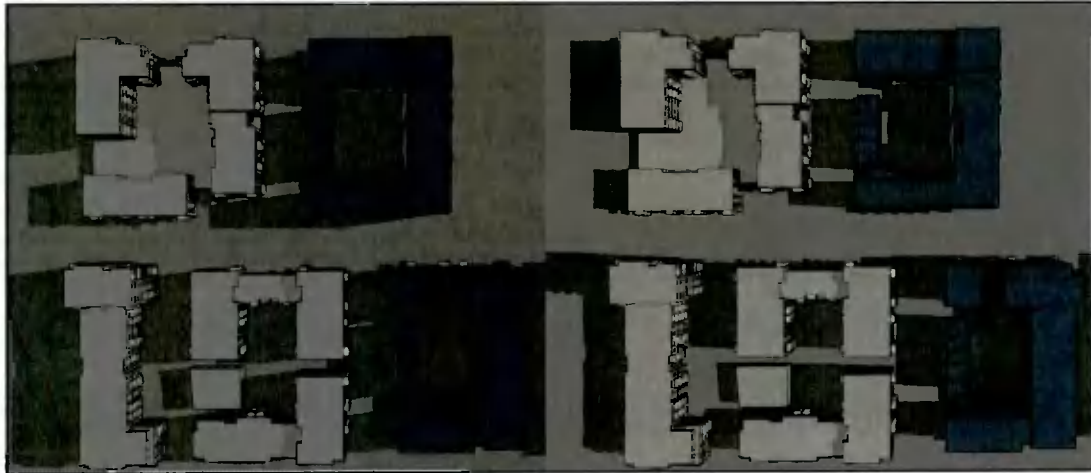


Figure 41: Overshadowing Images on June 21<sup>st</sup> at 7 a.m. and 8 a.m.

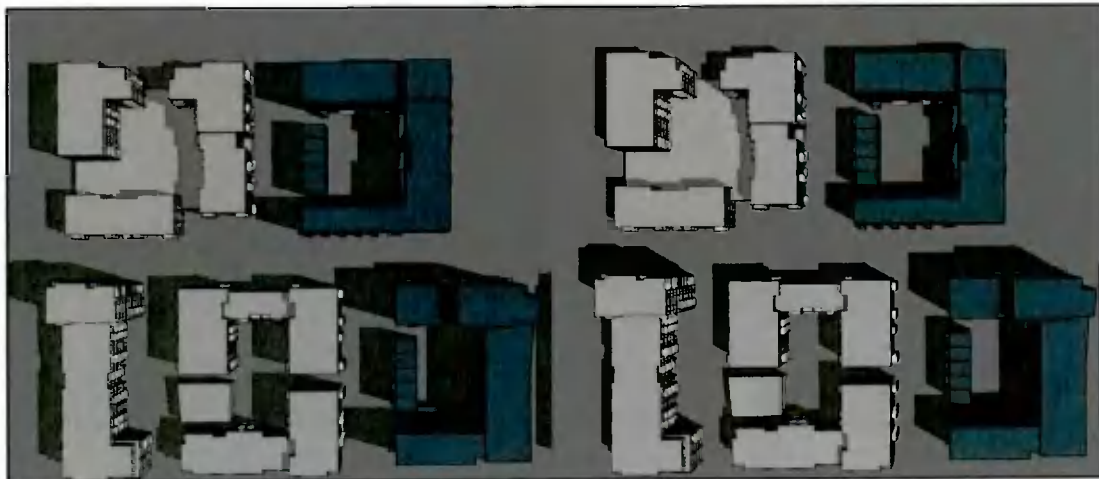


Figure 42: Overshadowing Images on June 21<sup>st</sup> at 9 a.m. and 10 a.m.

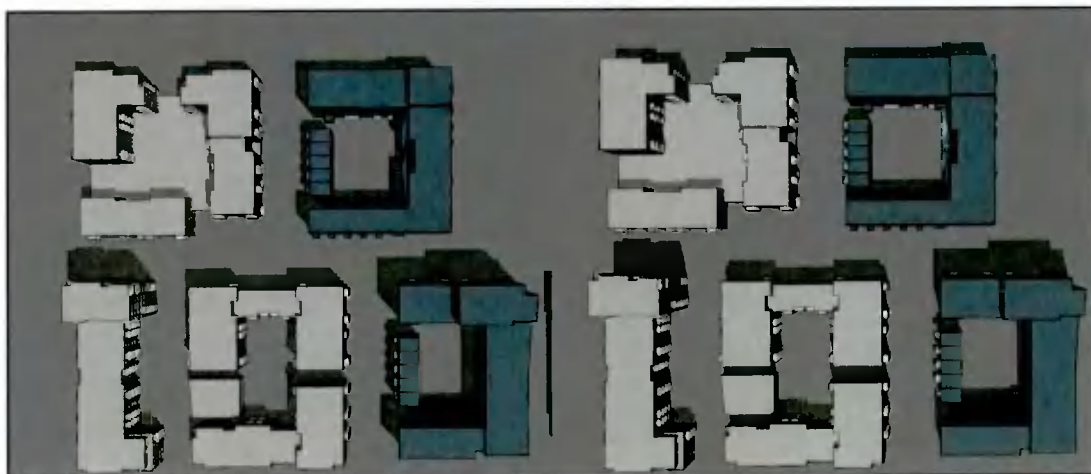


Figure 43: Overshadowing Images on June 21<sup>st</sup> at 11 a.m. and 12 p.m.



Figure 44: Overshadowing Images on June 21<sup>st</sup> at 1 p.m. and 2 p.m.

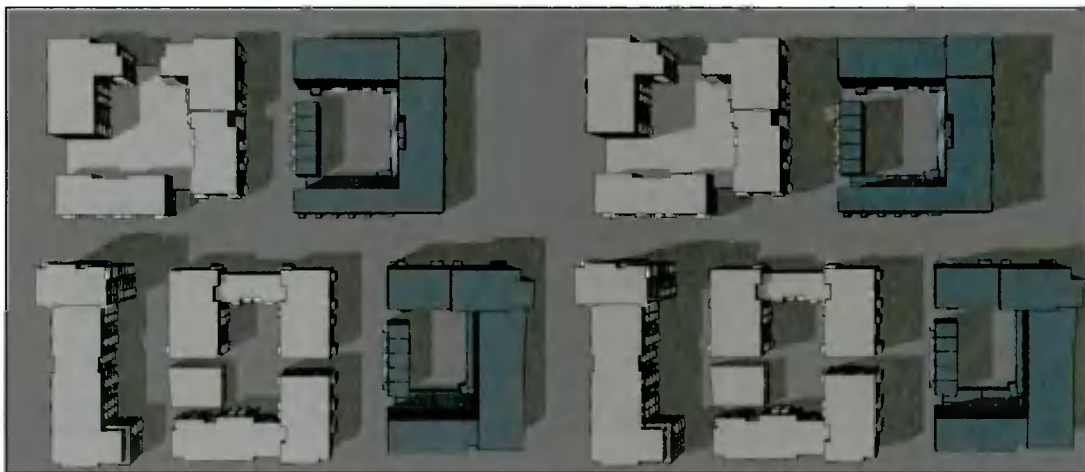


Figure 45: Overshadowing Images on June 21<sup>st</sup> at 3 p.m. and 4 p.m.

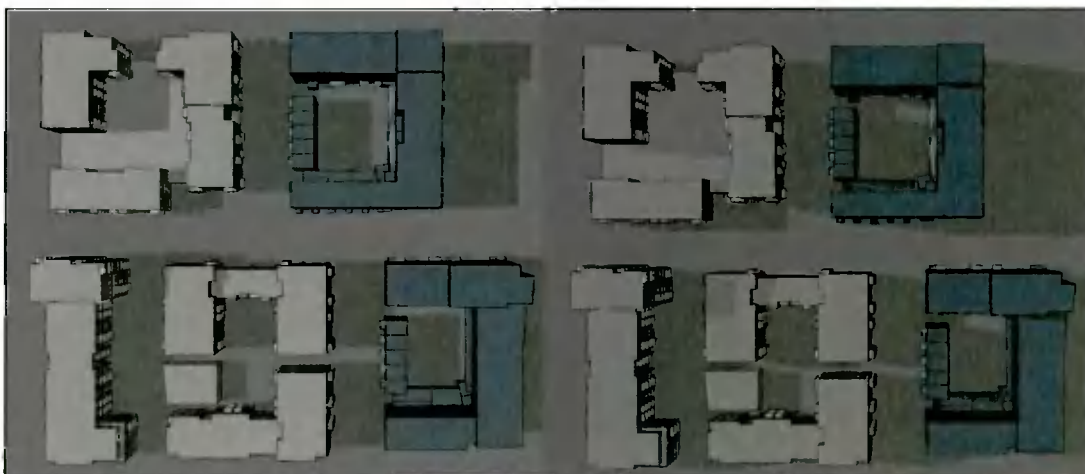


Figure 46: Overshadowing Images on June 21<sup>st</sup> at 5 p.m. and 6 p.m.

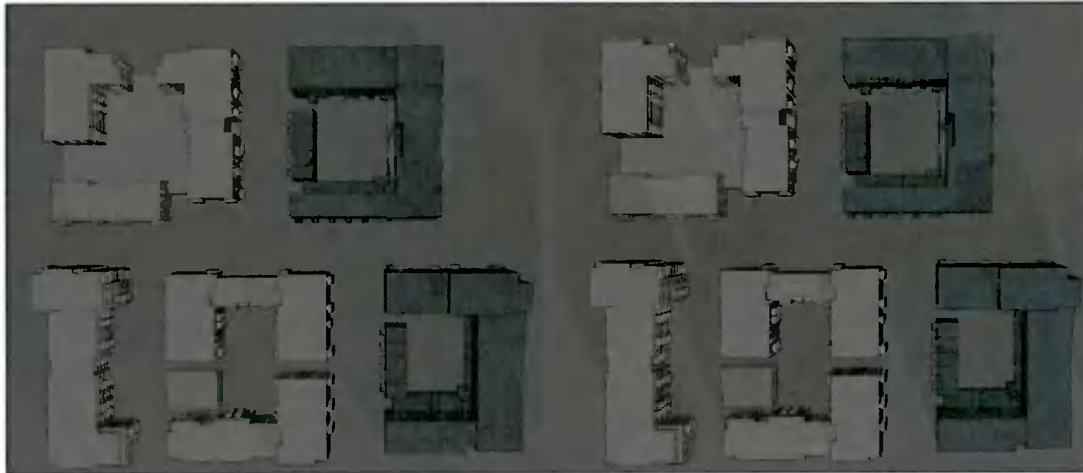


Figure 47: Overshadowing Images on December 21<sup>st</sup> at 10 a.m. and 11 a.m.

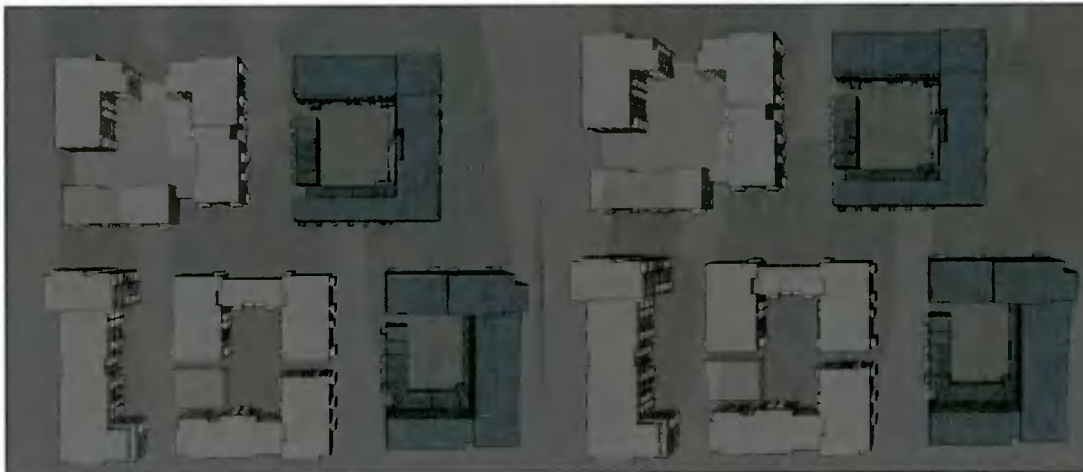


Figure 48: Overshadowing Images on December 21<sup>st</sup> at 12 p.m. and 1 p.m.

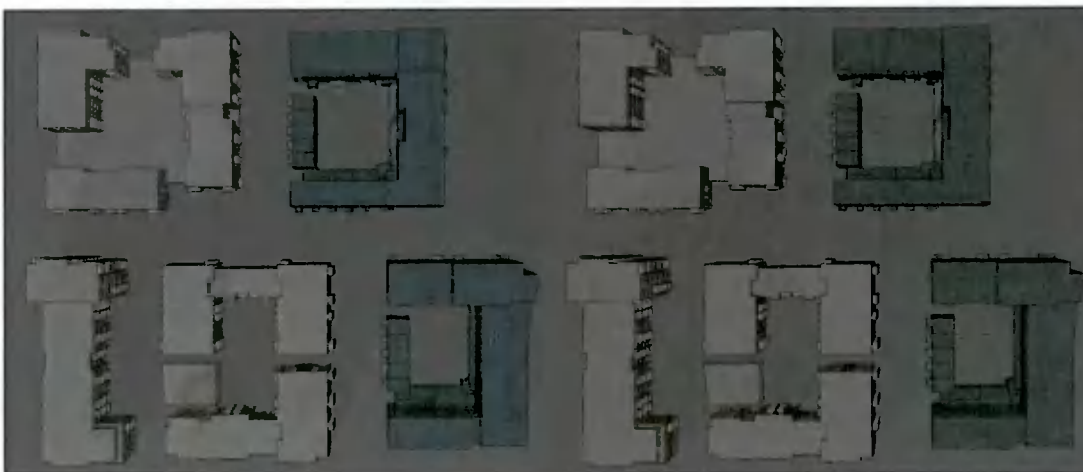


Figure 49: Overshadowing Images on December 21<sup>st</sup> at 2 p.m. and 3 p.m.

## 12. CONCLUSION

The proposed Adamstown Blocks A, C & D development has been analysed in order to determine the following:

- The daylight levels within the living and bedroom areas of selected apartments, to give an indication of the expected daylight levels throughout the proposed development;
- The expected sunlight levels within the living areas and bedrooms of the proposed development;
- The quality of amenity spaces, being provided as part of the development, in relation to sunlight;
- Any potential overshadowing impact the proposed development may have on properties adjacent to the site.

Calculations and methodology used are in accordance with BRE Guidelines for daylight and sunlight and based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition, however, the following should be reiterated as previously outlined:

*"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 numeral guidelines these should be interpreted flexibly because natural lighting is only one of the many factors in site layout design"*

The calculation methodology for daylight and sunlight is based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition.

### Internal Daylight

The analysis confirms that across the entire development excellent levels of internal daylight are achieved. A  $\geq 95\%$  compliance rate is achieved across the entire development.

Throughout the full development, comfortable and desirable spaces have been designed with high floor to ceiling heights aiding to further enhance the opportunity for improved daylight levels and



extensive glazing to every room enabling deep daylight penetration and providing enhanced views to a beautiful landscaped area.

#### Sunlight to proposed development amenity spaces

Sunlight analysis has shown that excellent levels of sunlight will be achieved within the proposed development. At least 2 hours of sunlight are achieved on March 21<sup>st</sup> on the majority of the amenity spaces provided, thus complying with BRE Guidelines.

#### Sunlight to windows within the proposed development

The annual probable sunlight hours assessment has shown that even though some windows fall under the BRE recommendations, good levels of sunlight will still be achieved within the proposed development. The shortfall in achieving the BRE recommendations is marginal in the majority of cases and can be attributed to the location of these windows in low levels and mainly to the north orientations. Also, the location of balconies to living rooms, which have been designed in line with the Design Standards for New Apartments documents, will naturally reduce the amount of sunlight to those windows but will provide occupant with an amenity space that will receive excellent levels of sunlight.

#### Impact to surrounding properties

The 25° line, VSC and APSH analysis have demonstrated that the proposed building has negligible daylight and sunlight impact to adjacent properties outside of this specific Adamstown development.

In conclusion, the steps taken by the project team during design have ensured that levels of daylight and sunlight within the development have been safeguarded and the impact to adjacent properties outside of the proposed development works are considered negligible.





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