

# Daylight & Sunlight Report

TRANSITIONAL CARE FACILITY at UNIT 21, FIRST AVENUE,  
COOKSTOWN INDUSTRIAL ESTATE, DUBLIN 24  
ASSESSMENT OF DAYLIGHT AND SUNLIGHT



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**at**  
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**DAYLIGHT AND SUNLIGHT REPORT**

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## Contents

Figures.....	1
Tables.....	2
1 Executive Summary.....	3
1.1 Proposed Development .....	3
1.1.1 Daylight .....	4
1.1.2 Sunlight .....	4
2 Introduction .....	5
2.1 BRE Guidelines .....	7
2.2 Glossary.....	8
3 Assessment Methodology.....	9
3.1 BS EN 17037:2018 – ‘Daylight in Buildings’ .....	9
3.1.1 Method 1 – Daylight Factor .....	9
3.1.2 Method 2 – Illuminance Levels .....	10
3.2 IS EN 17037:2018 .....	10
3.3 Sunlight .....	10
3.4 Gardens and Open Spaces/Site Shadow Analysis.....	11
4 Site Information .....	12
5 Proposed Development .....	13
5.1 Daylight .....	14
5.2 Sunlight .....	15
5.3 Gardens & Open Spaces.....	17
6 Results Summary.....	21
6.1 Proposed .....	21
6.1.1 Daylight .....	21
6.1.2 Sunlight .....	21
7 Conclusions .....	22
8 Bibliography .....	23
9 Appendices.....	24
9.1 Appendix A – BS EN 17037 (2018) .....	24
9.2 Appendix B – IS EN 17037 (2018).....	30
9.3 Appendix C – Proposed Site Shadow Analysis .....	35
9.3.1 Proposed – 21 March.....	35

Figures

Figure 1: Site Location Map ..... 12

Figure 2: Architectural Site Plan of the Proposed Development ..... 13

Figure 3: 3-Dimensional of the Simulation Model ..... 13

Figure 4: Sun Exposure on North Elevation March 21 ..... 15

Figure 5: Sun Exposure on Southwest Elevation March 21 ..... 16

Figure 6: Sun Exposure on Southeast Elevation March 21 ..... 16

Figure 7: Sun Exposure on the transitional care facility Courtyard on March 21 ..... 17

Figure 8: Sun Exposure on the Pocket Park on March 21 ..... 18

Figure 9: Proposed Site Shadow Analysis on March 21 @07:00 (left) @08:00 (right) ..... 35

Figure 10: Proposed Site Shadow Analysis on March 21 @09:00 (left) @10:00 (right) ..... 35

Figure 11: Proposed Site Shadow Analysis on March 21 @11:00 (left) @12:00 (right) ..... 36

Figure 12: Proposed Site Shadow Analysis on March 21 @13:00 (left) @14:00 (right) ..... 36

Figure 13: Proposed Site Shadow Analysis on March 21 @15:00 (left) @16:00 (right) ..... 37

Figure 14: Proposed Site Shadow Analysis on March 21 @17:00 ..... 37

Tables

Table 1: BRE Gardens & Open Spaces Results for the Proposed Development on March 21..... 4  
Table 2: Proposed Development - BS EN 10737 Results..... 14  
Table 3: Sun Exposure Summary Results ..... 15

## 1 Executive Summary

J.V. Tierney & Co. have been commissioned to undertake a daylight and sunlight study for the proposed transitional care facility at Unit 21, First Avenue, Cookstown Industrial Estate, Dublin 24.

The study follows the guidance outlined in *'Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities'* (Department of Housing, Planning and Local Government, 2020), and *'Urban Development and Building Heights: Guidelines for Planning Authorities'* (Department of Housing, Planning and Local Government, 2018), which state *"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' (2<sup>nd</sup> edition) or BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'"* (Department of Housing, Planning and Local Government, 2020). It should be noted that while the transitional care facility is not strictly a residential dwelling, the guidance outlined in the above is still applicable to some of the room types in the building.

The BRE guide *'Site Layout Planning for Daylight and Sunlight' (2<sup>nd</sup> edition)* and *BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'* have been superseded by BR209 *'Site Layout Planning for Daylight and Sunlight' (3<sup>rd</sup> edition)* and *BS EN 17037 – 'Daylight in Buildings'* respectively and have been adopted for this study.

The study follows the Guidance set out in BR209 (2022) and where it has diverged from it, we have availed of alternative compensatory design solutions, as allowed within the Guidance, such that the design meets with the principles of the BRE guide *'Site Layout Planning for Daylight and Sunlight' (3<sup>rd</sup> edition)* and *BS EN 17037* (British adoption of European Standard EN 17037). Good quality daylight and sunlight is available across a substantial portion of the development.

### 1.1 Proposed Development

The proposed transitional care facility has been assessed in line with *BS EN 17037 - 'Daylight in Buildings'* as outlined in the latest revision of *'Site Layout Planning for Daylight and Sunlight' (3<sup>rd</sup> edition)*.

Daylight analysis was undertaken on all occupiable rooms within the proposed development. A total of 159 no. rooms have been assessed, this includes offices, dining rooms, living spaces and bedrooms. Of the 159 no. rooms assessed, 156 no. meet the target daylight levels outlined in *BS EN 17037* meaning 98.1% of all rooms meet the daylight guidelines of BR209 (2022).

1.1.1 Daylight

1. BS EN 17037; 159 no. rooms assessed, 98.1% of all rooms meet the criteria
2. IS EN 17037; 159 no. rooms assessed, 78.0% of all rooms meet the criteria

1.1.2 Sunlight

The proposed transitional care facility has been assessed in line with BS EN 17037 'Daylight in Buildings' as outlined in the latest revision of BR209 (2022).

Sunlight analysis was undertaken on all occupiable rooms within the proposed development. A total of 159 no. rooms have been assessed, this includes offices, dining rooms, living spaces and bedrooms. Of the 159 no. rooms assessed, 124 no. meet the target Sunlight level of 1.5 hours of direct sunlight on 21 March as outlined in BS EN 17037 meaning 78% of all rooms meet the sunlight guidelines of BR209 (2022).

The communal amenity space has been assessed under the 'Gardens and Open Spaces' methodology; and meets the guidelines on March 21. A combination of building form and building height adjustments has contributed to the improvement in sunlight access to courtyard amenity areas

Table 1: BRE Gardens & Open Spaces Results for the Proposed Development on March 21

Communal Amenity Space	Total Amenity Area (m <sup>2</sup> )	Total Courtyard Area Receiving More Than 2 Hours (m <sup>2</sup> )	Percentage of Courtyard Area Receiving more than 2 Hours (%)	Status (Meets/Below BRE Guidelines)
Courtyard	519	501	96.5	Meets
Pocket Garden	1286	1283	99.8	Meets

## 2 Introduction

J.V. Tierney & Co. have been commissioned to undertake a daylight and sunlight study for the proposed transitional care facility at Unit 21, First Avenue, Cookstown Industrial Estate, Dublin 24.

South Dublin County Development Plan 2022 – 2028 states “*Developments shall be guided by the quantitative performance approaches and recommendations under the ‘Site Layout Planning for Daylight and Sunlight’ (2nd edition): A Guideline to Good Practice (BRE 2011) and BS 8206-2: 2008 – ‘Lighting for Buildings – Part 2: Code of Practice for Daylighting’. and/or any updated guidance.*”. Therefore, the analysis has been carried out in line with ‘*Site Layout Planning for Daylight and Sunlight (3rd edition)*’. This guide is a comprehensive revision of the 2011 edition of ‘*Site Layout Planning for Daylight and Sunlight: A guide to good practice’ (3rd edition)*, which is now withdrawn.

A 3D geometric model of the site was created using software IES-VE 2022 and using drawings issued by EML Architecture. The simulation model accounts for all existing buildings surrounding the site as per the BR209 (2022).

It should be noted that the guidance in this document should be seen as advice only and it should not constrain the design, “*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*”.

The guidance from ‘*Site Layout Planning for Daylight and Sunlight*’, should be seen as not being suitable for rigid application to all developments in the context of national and local policies for the consolidation and densification of urban areas.

The following planning documents; ‘*Urban Design Manual, A Best Practice Guide*’, ‘*Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities*’ and ‘*Urban Development and Building Heights: Guidelines for Planning Authorities*’, reference BR209 ‘*Site Layout Planning for Daylight and Sunlight (2nd edition 2011)*’ for quantifying daylight and sunlight in proposed and existing buildings. It is acknowledged that this document is now withdrawn in place of BR209 ‘*Site Layout Planning for Daylight and Sunlight (3rd edition)*’, however the planning guidelines outlined are the latest revisions and as such the guidance has been followed for this assessment.

The ‘*Urban Design Manual, A Best Practice Guide*’ (Environment, Heritage and Local Government, 2009) states that it may not always be possible to meet the criteria within ‘*Site Layout Planning for*



*Daylight and Sunlight* for urban areas. “Where design standards are to be used (such as the UK document *Site Layout Planning for Daylight and Sunlight*, published by the BRE), it should be acknowledged that for higher density proposals in urban areas it may not be possible to achieve the specified criteria, and standards may need to be adjusted locally to recognise the need for appropriate heights or street widths” (Environment, Heritage and Local Government, 2009).

The *‘Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities’* (Department of Housing, Planning and Local Government, 2020), also reiterates the point mentioned above and states that, “High density apartment schemes in urban locations should include shadow analysis diagrams at application stage. While overshadowing is clearly not generally desirable, it must be accepted that there may inevitably be some element of overshadowing at certain times of the day and/or year, subject to orientation, layout etc., in order to achieve urban development. In assessing development proposals, planning authorities must weigh up the overall quality of the design and layout of the scheme and measures undertaken to avoid overshadowing, with the location of the site and the need to ensure an appropriate scale of urban residential development” (Department of Housing, Planning and Local Government, 2020).

The *‘Urban Development and Building Heights: Guidelines for Planning Authorities’* (Department of Housing, Planning and Local Government, 2018) have been prepared in response to the publication of *‘Project Ireland 2040 – National Planning Framework’*. The *‘Building Heights’* guidelines state “that 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’* (Department of Housing, Planning and Local Government, 2018).

The *‘Building Heights’* guidelines also state “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” (Department of Housing, Planning and Local Government, 2018).

It should be noted that while the transitional care facility is not strictly a residential dwelling and so falls outside of some of the above guidelines, the guidance outlined in the above is still applicable to some of the room types in the building.

In line with the provisions of the 'Apartment Guidelines' as discussed above, the 'Building Heights' guidelines make allowances for where a proposal may not fully meet all requirements of daylight provisions, 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.

With this report discretion should be applied where it is desired that a scheme meets wider planning objectives such as comprehensive urban regeneration. This is applicable to the subject scheme whereby the requirement to provide for a sustainable level of development results in a need for some discretion to be applied in terms of completely meeting performance standards.

Comments in relation to overshadowing from the 'Site Layout Planning for Daylight and Sunlight', guide also state that some degree of overshadowing is to be expected. The guide states that, "*It must be borne in mind that nearly all structures will create areas of new shadow, and some degree of transient overshadowing of a space is to be expected*" (3<sup>rd</sup> edition).

In general, the design meets with the principles of the *BRE guide*, and the latest guidelines as issued by the Department of Housing with good quality daylight available across a substantial portion of the development.

## 2.1 BRE Guidelines

The purpose of this guide is to provide advice on a buildings site plan and layout to achieve good levels of daylighting and sun lighting. The guide provides calculation methodologies which aims to assist clients, consultants and planning officials make informed decisions on site layout to ensure no significant loss of light occurs. It should be noted that the guidance in this document should be seen as advice only and it should not constrain the design.

If this guidance is followed the end result is a site which is positioned and laid out in such a way which will provide adequate levels of sun lighting and daylighting while creating an ambience that will appeal to any building occupant.

## 2.2 Glossary

CIE - The standard CIE (Commission Internationale de L'Eclairage – International Commission on Illumination) overcast sky. The CIE Overcast sky is intended for two purposes; to be a universal basis for the classification of measured sky luminance distributions and to give a method for calculating sky luminance in daylighting design procedures.

VSC - Vertical Sky Component. This is the ratio of the direct sky illuminance falling on the vertical wall at a reference point (usually the centre of the window), to the simultaneous horizontal illuminance under an unobstructed sky that is received from a CIE overcast sky.

APSH – Annual Probable Sunlight Hours. Here “probable sunlight hours” means the total number of hours in the year that the sun is expected to shine on unobstructed ground, allowing for average levels of cloudiness for the location in question.

### 3 Assessment Methodology

The BRE Guide – ‘Site Layout Planning for Daylight and Sunlight 3<sup>rd</sup> Edition 2022’ puts forth assessment methodologies which consider daylight and sunlight for new developments and existing buildings.

#### 3.1 BS EN 17037:2018 – ‘Daylight in Buildings’

The BRE Guide BR209 (2022) now aligns with the British adoption of the European standard (BS EN 17037:2018) which has produced a national annex which gives more appropriate daylight targets for applicability within residential schemes.

BS EN 17037:2018 aims to ensure new buildings create spaces with significant daylight availability to provide adequate illumination to indoor surfaces and save energy for electrical bills. To do so BS EN 17037:2018 proposes two methods to assess daylight provision in all regularly occupied spaces: a calculation method based on daylight factor and cumulative daylight availability data (method 1); or a calculation method based on the direct prediction of illuminance levels using hourly climate data (method 2). Method 2 can be considered to be a more accurate representation of the daylight achieved; therefore, this method has been used for this analysis.

##### 3.1.1 Method 1 – Daylight Factor

A similar approach to previous ADF calculations in that Daylight factors (DF) are calculated under an ‘Overcast Sky’. However, in this methodology rather than using an Average Daylight Factor, 50% of the reference plane (i.e., floor area) must achieve the corresponding DF.

Daylight factor targets within BS EN 17037 are the required “DF” to achieve the Target Illuminance Levels. Utilising calculation Method 1, the below daylight levels are considered to be more in line with the BRE guide (2011) and BS 8206.

- Bedrooms = 0.7 Daylight Factor across 50% of the area of the room
- Living Space = 1.0 Daylight Factor across 50% of the area of the room
- All other spaces must achieve both of the following criteria:
  - 2.0 Daylight Factor across 50% of the area of the room for 50% of daylight hours
  - 0.7 Daylight Factor across 95% of the area of the room for 50% of daylight hours

### 3.1.2 Method 2 – Illuminance Levels

Calculation Method 2 utilises “Climate Based Daylight Modelling” which uses annual climate data appropriate to the site to determine illuminance levels. As this method uses yearly sun and sky conditions to determine illuminance levels, it can be considered to be a more accurate representation of the daylight achieved, therefore this method has been used for this analysis.

Utilising calculation Method 2, the below daylight levels are considered to be more in line with the BRE guide (2011) and BS 8206.

- Bedrooms = 100 Lux across 50% of the area of the room for 50% of daylight hours
- Living Space = 150 Lux across 50% of the area of the room for 50% of daylight hours
- All other spaces must achieve both of the following criteria:
  - 300 Lux across 50% of the area of the room for 50% of daylight hours
  - 100 Lux across 95% of the area of the room for 50% of daylight hours

### 3.2 IS EN 17037:2018

The Irish adoption of EN 17037 follows the same methodology outlined in the European Standard. IS EN 17037:2018 requires a space to meet a target illuminance of 300 Lux, across 50% of the reference plane for half of the daylight hours of the year (Criteria 1). The minimum target illuminance of 100 Lux is also required across 95% of the reference plane for half of the daylight hours (Criteria 2). Both criteria must be achieved for a space to meet IS EN 10737:2018.

### 3.3 Sunlight

Direct Sunlight is generally desired within residential dwellings. Around 90% of people say they appreciate having sunlight in their homes, which makes rooms look bright and cheerful.

A south-facing window will, in general, receive most sunlight, while a north-facing one will only receive it on a handful of occasions (early morning and late evening in summer). East- and west-facing windows will receive sunlight only at certain times of the day. A dwelling with no main window wall within 90° of due south is likely to be perceived as insufficiently sunlit.

Access to Sunlight in a proposed development can be quantified using BS EN 17037 which recommends that a space should receive a minimum of 1.5 hours of direct sunlight on 21<sup>st</sup> of March (equinox).

### 3.4 Gardens and Open Spaces/Site Shadow Analysis

While providing good levels of daylight and sunlight in living spaces is important, it is also essential to apply the same approach to outside spaces and amenity areas. An adequately lit garden or open space creates a rich ambience that any occupant would find appealing. A well-lit garden or open space will add value to a property, so it is essential that careful consideration is taken when assessing these spaces.

This methodology is therefore used to assess sunlight access to communal amenity spaces within the proposed development and to adjacent residential gardens.

The basis of this calculation is to assess if 50% of the garden area or open space will achieve more than two hours' worth of sunlight on the 21<sup>st</sup> of March (Equinox). If the garden or open space can meet this criterion, then no further analysis needs to be carried out.

If the above thresholds cannot be met, then a comparison is made between the sunlight received in the gardens/ open space as the existing site currently stands and the sunlight received in the gardens/ open space with the proposed development in place. If the reduction is greater than 20% then the occupants will notice the reduction in sunlight.

As per the BRE guide – *“the equinox (21<sup>st</sup> of March) is the best date for which to prepare shadow plots as it gives an average level of shadowing” (3<sup>rd</sup> edition)*, additionally *“plots for summertime (eg 21<sup>st</sup> of June) may be helpful as they will show the reduced shadowing then” (3<sup>rd</sup> edition)*.

## 4 Site Information

The location map showing the principal development site located at Unit 21, First Avenue, Cookstown Industrial Estate, Dublin 24 is shown below.

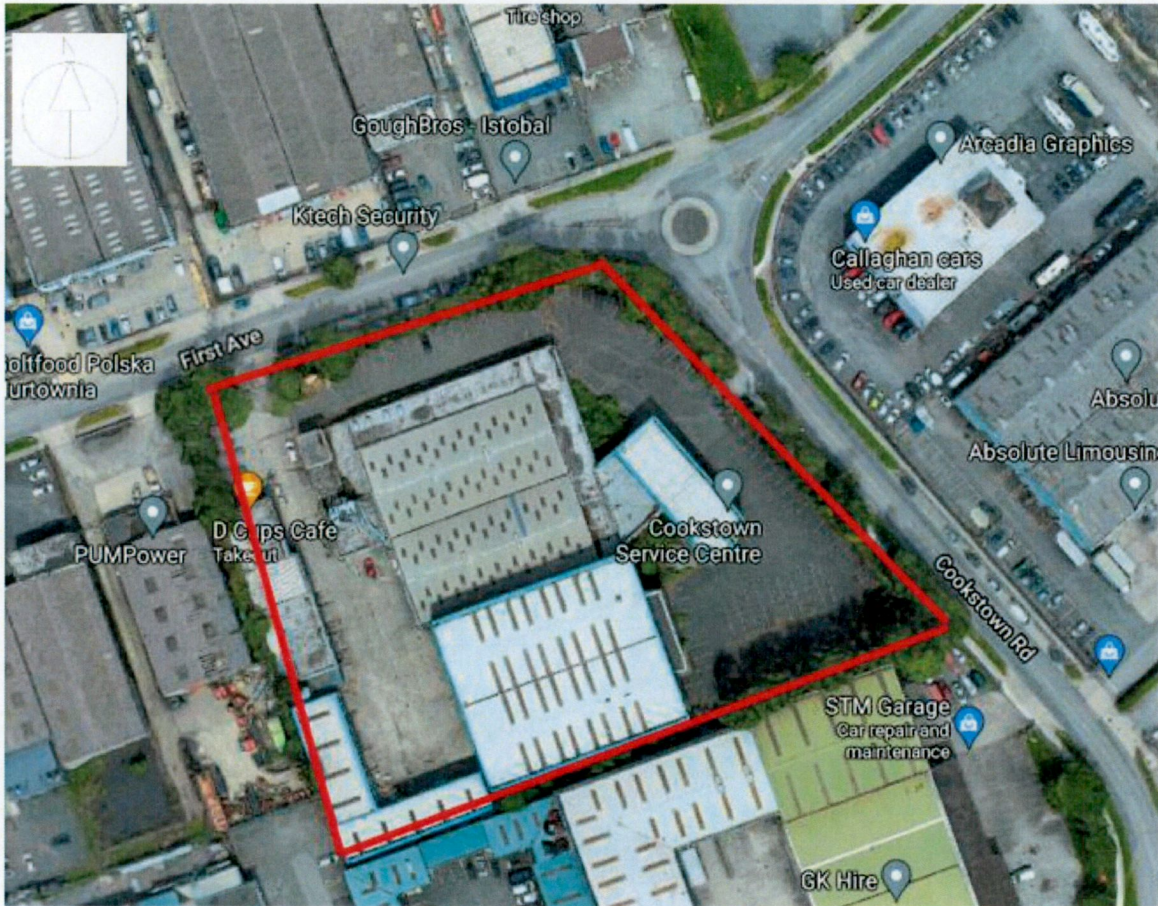


Figure 1: Site Location Map

## 5 Proposed Development

The proposed development which consists of a transitional care facility consisting of bedrooms, offices, dining rooms and living areas. This study addresses access to daylight and sunlight within the proposed development, therefore two methodologies will be used.

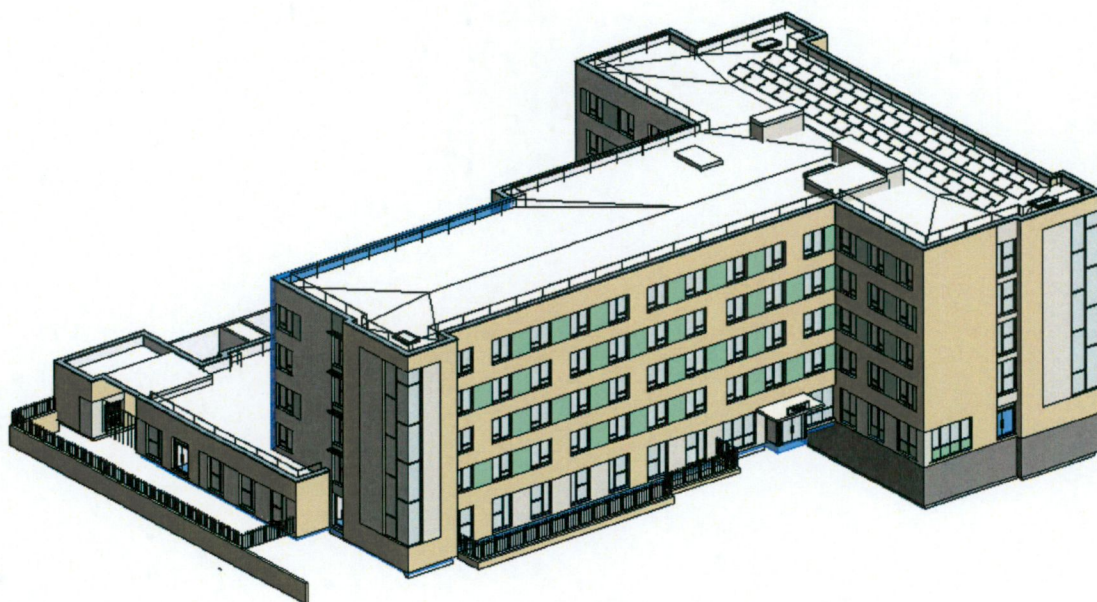


Figure 2: Architectural Site Plan of the Proposed Development

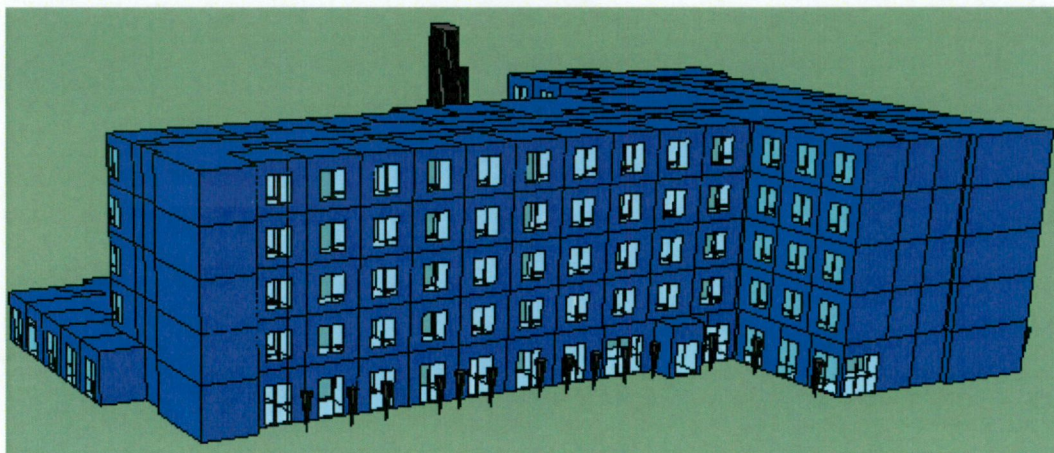


Figure 3: 3-Dimensional of the Simulation Model

This study addresses access to daylight and sunlight within the proposed development. Habitable rooms of the buildings will be assessed with BS EN17037:2018 and IS EN 17037:2018 which are used for assessing daylight quality. Sunlight exposure to transitional care facility will be assessed using a 'Sunlight Hours' methodology as outlined in BS EN 10737:2018, refer to Section 3.3 for a detailed



description. Amenity areas will be assessed with the 'Gardens & Open Spaces' methodology as outlined in BR209 (2022), refer to Section 3.6.

### 5.1 Daylight

The proposed transitional care facility has been assessed in line with BS EN 17037 'Daylight in Buildings' as outlined in the latest revision of 'Site Layout Planning for Daylight and Sunlight' (3<sup>rd</sup> edition). BS EN 17037 (2018) is the British adoption of the European Standard and requires the following daylight targets:

- Bedrooms = 100 Lux across 50% of the area of the room
- Living Space = 150 Lux across 50% of the area of the room
- All other spaces must achieve two criteria must be meet
  - 300 Lux across 50% of the area of the room for 50% of daylight hours
  - 100 Lux across 95% of the area of the room for 50% of daylight hours

Table 1 below summarises the results of the daylight analysis undertaken on all occupiable rooms within the proposed development. A total of 159 no. rooms have been assessed, this includes bedrooms, offices, and living/dining areas. Of the 159 no. rooms assessed, 156 no. meet the target daylight levels outlined in BS EN 17037 meaning 98.1% of all rooms meet the guidelines of BR209 (2022). Detailed results for each block can be found in Appendix A.

To ensure alignment with all available standards IS EN 17037 has been addressed in Appendix B.

Table 2: Proposed Development - BS EN 17037 Results

Floor	No. of Dining/Living rooms	Rooms Meeting BS EN 17037	No. of Bedrooms	Rooms Meeting BS EN 17037	No. of other Rooms	Rooms Meeting BS EN 17037
1	3	3	19	19	5	2
2	4	4	28	28	2	2
3	4	4	28	28	2	2
4	4	4	28	28	2	2
5	4	4	28	28	2	2
Total	19	19	131	131	13	10

## 5.2 Sunlight

The proposed transitional care facility has been assessed in line with BS EN 17037 'Daylight in Buildings' as outlined in the latest revision of 'Site Layout Planning for Daylight and Sunlight' (3<sup>rd</sup> edition). BS EN 17037 (2018) is the British adoption of the European Standard and recommends a should receive a minimum of 1.5 hours of direct sunlight on March 21 (equinox).

A total of 159no. rooms have been assessed in the transitional care facility, this includes bedrooms, offices, and living/dining areas. As shown below, of the 159no. rooms assessed, 124no. meet the recommended Sunlight levels outlined in BS EN 17037 meaning 78.0% of all rooms meet the guidelines of BR209 (2022). The majority of windows are receiving the required 1.5 hours of sunlight. Given the urban setting of this site and the orientation of the building, some north facing windows are below the target however this is unavoidable in order to achieve urban regeneration.

Table 3: Sun Exposure Summary Results

Room Type	No. Rooms Assessed	No. Rooms Receiving 1.5 Hours of Sunlight on March 21
Bedroom	131	103
Living / Dining	19	18
Other Rooms	13	3

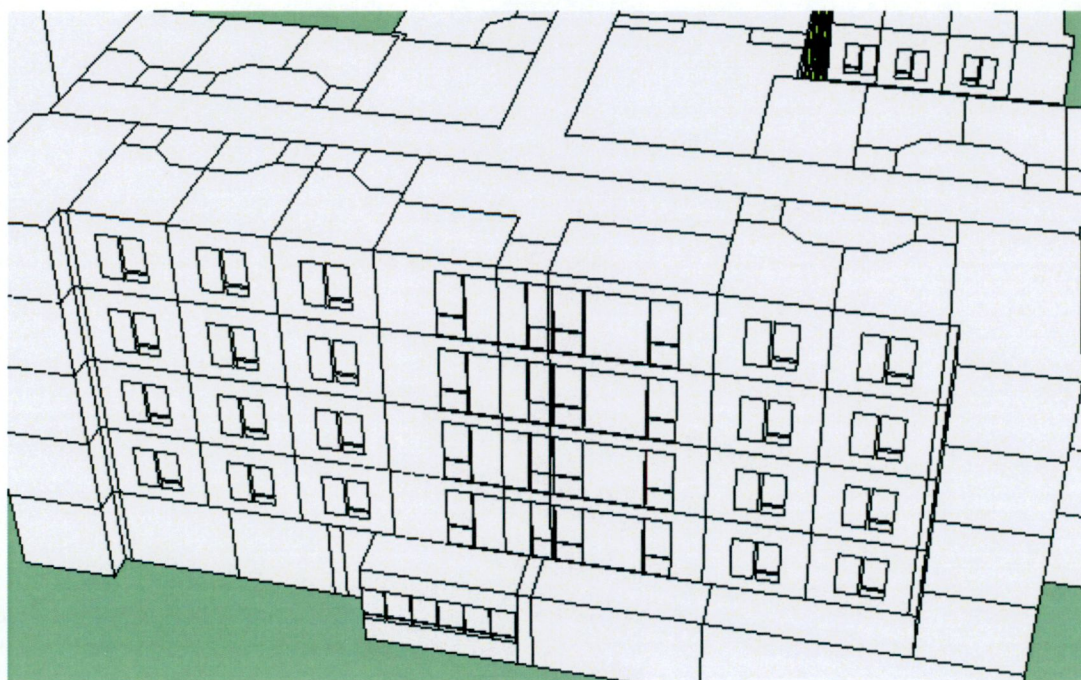


Figure 4: Sun Exposure on North Elevation March 21<sup>st</sup>

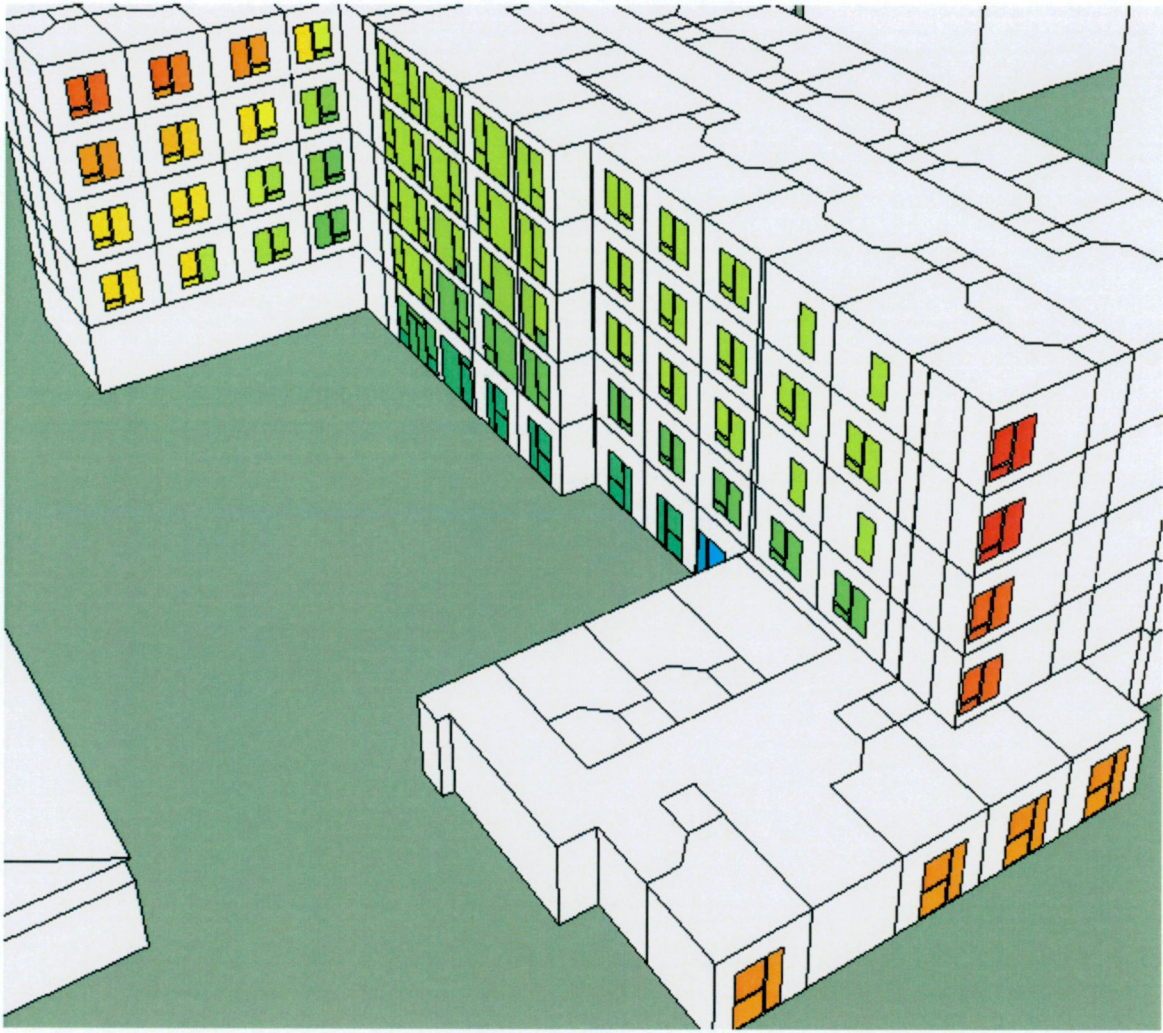


Figure 5: Sun Exposure on Southwest Elevation March 21<sup>st</sup>

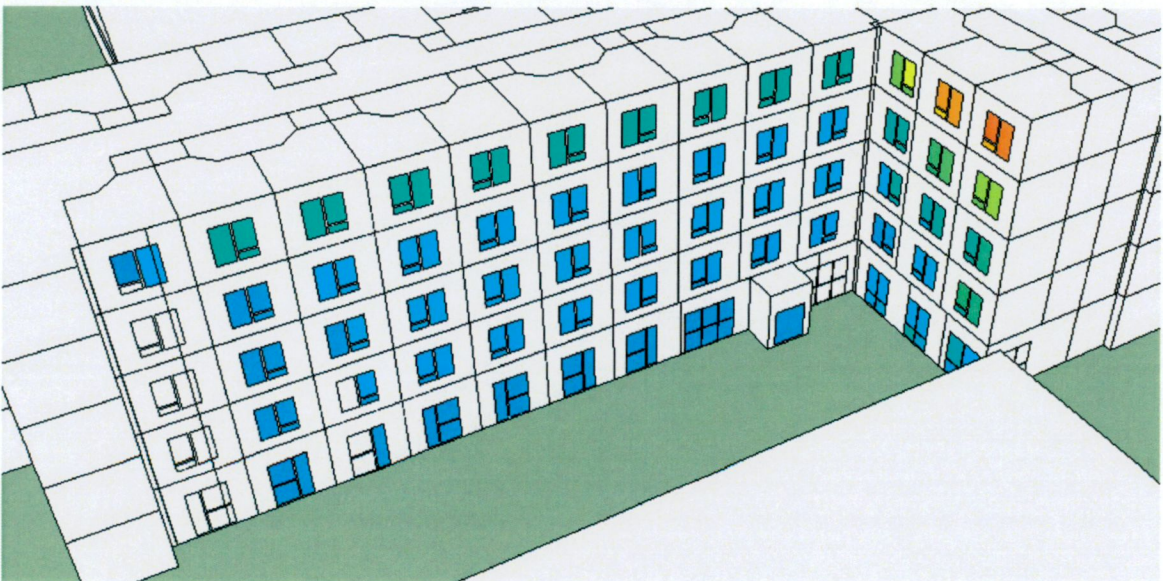


Figure 6: Sun Exposure on Southeast Elevation March 21<sup>st</sup>

### 5.3 Gardens & Open Spaces

While providing good levels of daylight and sunlight in living spaces is important, it is also essential to apply the same mentality to outside spaces and amenity areas. An adequately lit garden or open space creates a rich ambience that any occupant would find appealing. A well-lit garden/open space will add value to a property, so it is essential that careful consideration is taken when assessing these spaces. The transitional care facility is provided 519 m<sup>2</sup> open space to the West of the proposed development and a 1286 m<sup>2</sup> pocket park to the south.

Communal Amenity Space	Total Amenity Area (m <sup>2</sup> )	Total Courtyard Area Receiving More Than 2 Hours (m <sup>2</sup> )	Percentage of Courtyard Area Receiving more than 2 Hours (%)	Status (Meets/Below BRE Guidelines)
Courtyard	519	501	96.5	Meets
Pocket Garden	1286	1283	99.8	Meets



Figure 7: Sun Exposure on the transitional care facility Courtyard on March 21<sup>st</sup>

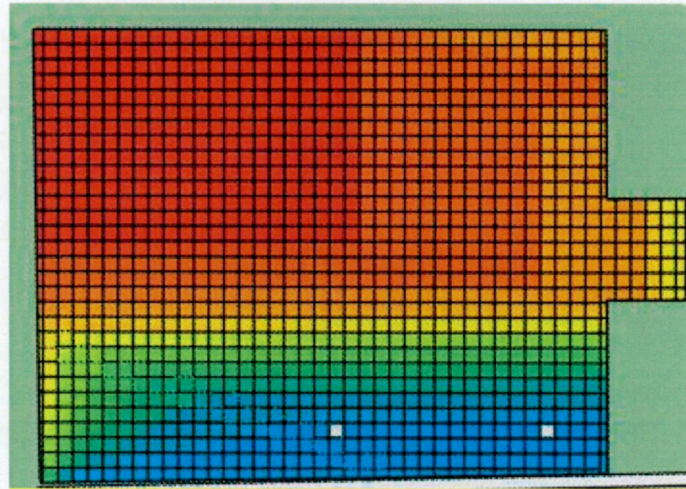


Figure 8: Sun Exposure on the Pocket Park on March 21<sup>st</sup>

## 6 Results Summary

### 6.1 Proposed

Daylight analysis undertaken on all occupiable rooms within the proposed development. A total of 159no. rooms have been assessed, this includes offices, dining rooms, living spaces and bedrooms. Of the 159no. rooms assessed, 156no. meet the target daylight levels outlined in BS EN 17037 meaning 98.1% of all rooms meet the guidelines of BR209 (2022). An assessment in line with IS EN 17037 was also completed, and the results are summarised below.

#### 6.1.1 Daylight

1. BS EN 17037: 159 no. rooms assessed, 98.1% of all rooms meet the criteria
2. IS EN 17037: 159 no. rooms assessed, 78.0% of all rooms meet the criteria

#### 6.1.2 Sunlight

1. Transitional care facility: 159no. rooms assessed, 78.0% of all rooms meet the criteria
2. Amenity: 1684 sq. m of communal amenity space provided, 98.8% of the area meets the criteria

## 7 Conclusions

When interpreting results, consideration should be given to the notes outlined in the introduction of this report. It is noted that there is some level of overshadowing from the proposed development, however given the urban setting of this site it is unavoidable in order to achieve urban regeneration.

As can be seen from the results, the majority of rooms meet the criteria set out in the BRE guidelines and are also in line with the development standards as set out by the Department of Housing (Department of Housing, Planning and Local Government, 2020). The results indicate a significant portion of the site will meet the criteria set out in BS EN 17037:2018 – Daylight in Buildings.

When looked at as a total, the quantum of spaces meeting the daylight targets is greater than 80% which exceeds international environmental assessment standards such as BREEAM, which targets a figure of 80% and LEED, which targets a figure of 75% to award a credit under the daylighting criteria and demonstrates that the development has '*maximised the daylight*' for the occupied spaces.

In conclusion, the design meets with the principles of the BRE guide - '*Site Layout Planning for Daylight and Sunlight*' (3<sup>rd</sup> edition) and IS EN 17037:2018 with good quality daylight available across a majority of the development.

## 8 Bibliography

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## 9 Appendices

### 9.1 Appendix A – BS EN 17037 (2018)

Space Name (Real)	Method 2		Status (Meets/below BS EN 17037 - Method 2 Criteria)
	Bedroom >100 Lux >50% Hours >50% Area	Living Space >150 Lux >50% Hours >50% Area	
	<i>% Area Meeting Target</i>	<i>% Area Meeting Target</i>	
L00 - DINING - 31	N/A	100	Meets
L00 - BEDROOM 78	100	N/A	Meets
L00 - STAFF CAFE	N/A	100	Meets
L00 - SEATING & COFFEE DOCK - 30	N/A	100	Meets
L00 - BEDROOM - 56	97	N/A	Meets
L00 - BEDROOM - 54	91	N/A	Meets
L00 - BEDROOM - 51	86	N/A	Meets
L00 - BEDROOM - 47	89	N/A	Meets
L00 - BEDROOM - 43	87	N/A	Meets
L00 - BEDROOM - 39	95	N/A	Meets
L00 - BEDROOM - 35	97	N/A	Meets
L00 - BEDROOM - 41	100	N/A	Meets
L00 - BEDROOM - 33	100	N/A	Meets
L00 - BEDROOM - 37	100	N/A	Meets
L00 - BEDROOM - 49	100	N/A	Meets
L00 - BEDROOM - 46	100	N/A	Meets
L00 - UD BEDROOM	100	N/A	Meets
L00 - BEDROOM - 66	100	N/A	Meets
L00 - BEDROOM - 62	100	N/A	Meets
L00 - BEDROOM - 60	100	N/A	Meets
L00 - BEDROOM - 71	100	N/A	Meets
L00 - BEDROOM - 68	100	N/A	Meets

Space Name (Real)	Method 2		Status (Meets/below BS EN 17037 - Method 2 Criteria)
	Bedroom >100 Lux >50% Hours >50% Area	Living Space >150 Lux >50% Hours >50% Area	
	<i>% Area Meeting Target</i>	<i>% Area Meeting Target</i>	
L01 -BEDROOM - 68	100	N/A	Meets
L01 -BEDROOM - 64	97	N/A	Meets
L01 -BEDROOM - 60	91	N/A	Meets
L01 -BEDROOM - 56	89	N/A	Meets
L01 -BEDROOM - 52	89	N/A	Meets
L01 -BEDROOM - 48	86	N/A	Meets
L01 -BEDROOM - 46	94	N/A	Meets
L01 -BEDROOM - 62	100	N/A	Meets
L01 -BEDROOM - 66	100	N/A	Meets
L01 -BEDROOM - 66	100	N/A	Meets
L01 -BEDROOM - 50	100	N/A	Meets
L01 -BEDROOM - 58	100	N/A	Meets
L01 -BEDROOM - 54	100	N/A	Meets
L01 -BEDROOM - 35	100	N/A	Meets
L01 -BEDROOM - 39	100	N/A	Meets
L01 -BEDROOM - 01	100	N/A	Meets
L01 -BEDROOM - 03	100	N/A	Meets
L01 -BEDROOM - 33	100	N/A	Meets
L01 - UD BEDROOM	82	N/A	Meets
L01 - SITTING ROOM	N/A	100	Meets
L01 - DINING ROOM	N/A	100	Meets
L01 -BEDROOM - 26	100	N/A	Meets
L01 -BEDROOM - 28	100	N/A	Meets
L01 -BEDROOM - 30	100	N/A	Meets
L01 -BEDROOM - 05	100	N/A	Meets
L01 -BEDROOM - 05	100	N/A	Meets
L01 -BEDROOM - 07	97	N/A	Meets
L01 -BEDROOM - 19	100	N/A	Meets
L01 - BEDROOM 84	100	N/A	Meets
L01 - FAMILY ROOM	N/A	95	Meets
L01 - BEDROOM 11	100	N/A	Meets

Space Name (Real)	Method 2		Status (Meets/below BS EN 17037 - Method 2 Criteria)
	Bedroom >100 Lux >50% Hours >50% Area	Living Space >150 Lux >50% Hours >50% Area	
	% Area Meeting Target	% Area Meeting Target	
L02 -BEDROOM - 64	100	N/A	Meets
L02 -BEDROOM - 60	100	N/A	Meets
L02 -BEDROOM - 56	100	N/A	Meets
L02 -BEDROOM - 52	100	N/A	Meets
L02 -BEDROOM - 48	97	N/A	Meets
L02 -BEDROOM - 46	100	N/A	Meets
L02 -BEDROOM - 50	100	N/A	Meets
L02 -BEDROOM - 58	100	N/A	Meets
L02 -BEDROOM - 54	100	N/A	Meets
L02 -BEDROOM - 68	100	N/A	Meets
L02 -BEDROOM - 66	100	N/A	Meets
L02 -BEDROOM - 62	100	N/A	Meets
L02 -BEDROOM - 01	100	N/A	Meets
L02 -BEDROOM - 33	100	N/A	Meets
L02 -BEDROOM - 35	100	N/A	Meets
L02 -BEDROOM - 39	100	N/A	Meets
L02 -BEDROOM - 41	100	N/A	Meets
L02 - UD BEDROOM	97	N/A	Meets
L02 -BEDROOM - 26	100	N/A	Meets
L02 -BEDROOM - 28	100	N/A	Meets
L02 -BEDROOM - 30	100	N/A	Meets
L02 -BEDROOM - 03	100	N/A	Meets
L02 -BEDROOM - 07	97	N/A	Meets
L02 -BEDROOM - 23	100	N/A	Meets
L02 -BEDROOM - 19	100	N/A	Meets
L02 - BEDROOM 84	100	N/A	Meets
L02 -BEDROOM - 05	100	N/A	Meets
L02 - DINING ROOM	N/A	100	Meets
L02 - SITTING ROOM	N/A	100	Meets
L02 - FAMILY ROOM	N/A	100	Meets
L02 - BEDROOM 11	100	N/A	Meets

Space Name (Real)	Method 2		Status (Meets/below BS EN 17037 - Method 2 Criteria)
	Bedroom >100 Lux >50% Hours >50% Area	Living Space >150 Lux >50% Hours >50% Area	
	<i>% Area Meeting Target</i>	<i>% Area Meeting Target</i>	
L03 -BEDROOM - 64	100	N/A	Meets
L03 -BEDROOM - 60	100	N/A	Meets
L03 -BEDROOM - 56	100	N/A	Meets
L03 -BEDROOM - 52	100	N/A	Meets
L03 -BEDROOM - 48	100	N/A	Meets
L03 -BEDROOM - 46	100	N/A	Meets
L03 -BEDROOM - 50	100	N/A	Meets
L03 -BEDROOM - 58	100	N/A	Meets
L03 -BEDROOM - 54	100	N/A	Meets
L03 -BEDROOM - 68	100	N/A	Meets
L03 -BEDROOM - 66	100	N/A	Meets
L03 -BEDROOM - 62	100	N/A	Meets
L03 -BEDROOM - 01	100	N/A	Meets
L03 -BEDROOM - 33	100	N/A	Meets
L03 -BEDROOM - 35	100	N/A	Meets
L03 -BEDROOM - 39	100	N/A	Meets
L03 -BEDROOM - 41	100	N/A	Meets
L03 - UD BEDROOM	100	N/A	Meets
L03 -BEDROOM - 26	100	N/A	Meets
L03 -BEDROOM - 28	100	N/A	Meets
L03 -BEDROOM - 30	100	N/A	Meets
L03 -BEDROOM - 03	100	N/A	Meets
L03 -BEDROOM - 07	100	N/A	Meets
L03 -BEDROOM - 23	100	N/A	Meets
L03 -BEDROOM - 19	100	N/A	Meets
L03 - BEDROOM 84	100	N/A	Meets
L03 -BEDROOM - 05	100	N/A	Meets
L03 - DINING ROOM	N/A	100	Meets
L03 - SITTING ROOM	N/A	100	Meets
L03 - FAMILY ROOM	N/A	100	Meets
L03 - BEDROOM 11	100	N/A	Meets

Space Name (Real)	Method 2		Status (Meets/below BS EN 17037 - Method 2 Criteria)
	Bedroom >100 Lux >50% Hours >50% Area	Living Space >150 Lux >50% Hours >50% Area	
	% Area Meeting Target	% Area Meeting Target	
L04 -BEDROOM - 64	100	N/A	Meets
L04 -BEDROOM - 60	100	N/A	Meets
L04 -BEDROOM - 56	100	N/A	Meets
L04 -BEDROOM - 52	100	N/A	Meets
L04 -BEDROOM - 48	100	N/A	Meets
L04 -BEDROOM - 46	100	N/A	Meets
L04 -BEDROOM - 50	100	N/A	Meets
L04 -BEDROOM - 58	100	N/A	Meets
L04 -BEDROOM - 54	100	N/A	Meets
L04 -BEDROOM - 68	100	N/A	Meets
L04 -BEDROOM - 66	100	N/A	Meets
L04 -BEDROOM - 62	100	N/A	Meets
L04 -BEDROOM - 01	100	N/A	Meets
L04 -BEDROOM - 33	100	N/A	Meets
L04 -BEDROOM - 35	100	N/A	Meets
L04 -BEDROOM - 39	100	N/A	Meets
L04 -BEDROOM - 41	100	N/A	Meets
L04 - UD BEDROOM	100	N/A	Meets
L04 -BEDROOM - 26	100	N/A	Meets
L04 -BEDROOM - 28	100	N/A	Meets
L04 -BEDROOM - 30	100	N/A	Meets
L04 -BEDROOM - 03	100	N/A	Meets
L04 -BEDROOM - 07	100	N/A	Meets
L04 -BEDROOM - 23	100	N/A	Meets
L04 -BEDROOM - 19	100	N/A	Meets
L04 - BEDROOM 84	100	N/A	Meets
L04 -BEDROOM - 05	100	N/A	Meets
L04 - DINING ROOM	N/A	100	Meets
L04 - SITTING ROOM	N/A	100	Meets
L04 - FAMILY ROOM	N/A	100	Meets
L04 -BEDROOM - 11	100	N/A	Meets

Space Name (Real)	Method 2		Status (Meets/below BS EN 17037 - Method 2 Criteria)
	>300 Lux >50% Hours >50% Area	>100 Lux >50% Hours >95% Area	
	<i>% Area Meeting Target</i>	<i>% Area Meeting Target</i>	
L00 - ORATORY	25	61	Meets
L00 - ADMIN OFFICE 01	63	100	Meets
L00 - INTERVIEW	1	100	Meets
L00 - D.O.N.	12	52	Below
L00 - RECEPTION	32	100	Below
L01 - ACTIVITY	100	100	Meets
L01 - PHYSIO	100	100	Meets
L02 - PHYSIO	100	100	Meets
L02 - ACTIVITY	100	100	Meets
L03 - PHYSIO	100	100	Meets
L03 - ACTIVITY	100	100	Meets
L04 - PHYSIO	100	100	Meets
L04 - ACTIVITY	100	100	Meets

## 9.2 Appendix B – IS EN 17037 (2018)

The Irish adoption of EN 17037 follows the same methodology outlines in the European Standard. Method 2 is a calculation method of illuminance levels on the reference plane using climatic data for the given site and an adequate time step.

Method 2 requires a space to meet a target illuminance of 300 Lux, across 50% of the reference plane for half of the daylight hours of the year (Criteria 1). The minimum target illuminance of 100 Lux is also required across 95% of the reference plane for half of the daylight hours (Criteria 2). Both criteria must be achieved for a space to meet IS EN 17037:2018.

Space Name (Real)	Method 2		Status (Meets/below IS EN 17037 - Method 2 Criteria)
	>300 Lux >50% Hours >50% Area	>100 Lux >50% Hours >95% Area	
	% Area Meeting Target	% Area Meeting Target	
L00 - ORATORY	25	61	Below
L00 - DINING - 31	90	100	Meets
L00 - ADMIN OFFICE 01	63	100	Meets
L00 - INTERVIEW	100	100	Meets
L00 - D.O.N.	12	52	Below
L00 - BEDROOM 78	100	100	Meets
L00 - STAFF CAFE	88	100	Meets
L00 - RECEPTION	32	100	Below
L00 - SEATING & COFFEE DOCK - 30	53	100	Meets
L00 - BEDROOM - 56	22	97	Below
L00 - BEDROOM - 54	26	91	Below
L00 - BEDROOM - 51	24	86	Below
L00 - BEDROOM - 47	29	89	Below
L00 - BEDROOM - 43	27	87	Below
L00 - BEDROOM - 39	31	95	Below
L00 - BEDROOM - 35	24	97	Below
L00 - BEDROOM - 41	80	100	Meets
L00 - BEDROOM - 33	93	100	Meets
L00 - BEDROOM - 37	100	100	Meets
L00 - BEDROOM - 49	44	100	Below
L00 - BEDROOM - 46	100	100	Meets
L00 - UD BEDRIIN 64	100	100	Meets
L00 - BEDROOM - 66	86	100	Meets
L00 - BEDROOM - 62	95	100	Meets
L00 - BEDROOM - 60	83	100	Meets
L00 - BEDROOM - 71	86	100	Meets

Space Name (Real)	Method 2		Status (Meets/below IS EN 17037 - Method 2 Criteria)
	>300 Lux >50% Hours >50% Area	>100 Lux >50% Hours >95% Area	
	% Area Meeting Target	% Area Meeting Target	
L01 -BEDROOM - 68	92	100	Meets
L01 -BEDROOM - 64	27	97	Below
L01 -BEDROOM - 60	31	91	Below
L01 -BEDROOM - 56	30	89	Below
L01 -BEDROOM - 52	29	89	Below
L01 -BEDROOM - 48	30	86	Below
L01 -BEDROOM - 46	29	94	Below
L01 -BEDROOM - 62	95	100	Meets
L01 -BEDROOM - 66	100	100	Meets
L01 -BEDROOM - 66	44	100	Below
L01 -BEDROOM - 50	80	100	Meets
L01 -BEDROOM - 58	100	100	Meets
L01 -BEDROOM - 54	100	100	Meets
L01 -BEDROOM - 35	70	100	Meets
L01 -BEDROOM - 39	60	100	Meets
L01 -BEDROOM - 01	54	100	Meets
L01 -BEDROOM - 03	60	100	Meets
L01 -BEDROOM - 33	35	100	Below
L01 - UD BEDROOM	27	82	Below
L01 - SITTING ROOM	100	100	Meets
L01 - DINING ROOM	100	100	Meets
L01 -BEDROOM - 26	77	100	Meets
L01 -BEDROOM - 28	92	100	Meets
L01 -BEDROOM - 30	100	100	Meets
L01 -BEDROOM - 05	50	100	Meets
L01 -BEDROOM - 05	54	100	Meets
L01 - ACTIVITY	100	100	Meets
L01 -BEDROOM - 07	37	97	Below
L01 - PHYSIO	100	100	Meets
L01 - BEDROOM - 19	54	100	Meets
L01 - FAMILY ROOM	100	100	Meets
L01 - BEDROOM 84	56	100	Meets
L01 - SITTING ROOM	95	100	Meets
L01 - BEDROOM 11	57	100	Meets



Unit 21, First Avenue, Cookstown - DAYLIGHT & SUNLIGHT

Space Name (Real)	Method 2		Status (Meets/below IS EN 17037 - Method 2 Criteria)
	>300 Lux >50% Hours >50% Area	>100 Lux >50% Hours >95% Area	
	% Area Meeting Target	% Area Meeting Target	
L02 -BEDROOM - 64	44	100	Below
L02 -BEDROOM - 60	41	100	Below
L02 -BEDROOM - 56	44	100	Below
L02 -BEDROOM - 52	41	100	Below
L02 -BEDROOM - 48	41	97	Below
L02 -BEDROOM - 46	41	100	Below
L02 -BEDROOM - 50	90	100	Meets
L02 -BEDROOM - 58	100	100	Meets
L02 -BEDROOM - 54	100	100	Meets
L02 -BEDROOM - 68	100	100	Meets
L02 -BEDROOM - 66	100	100	Meets
L02 -BEDROOM - 62	100	100	Meets
L02 -BEDROOM - 01	90	100	Meets
L02 -BEDROOM - 33	58	100	Meets
L02 -BEDROOM - 35	41	100	Below
L02 -BEDROOM - 39	54	100	Meets
L02 -BEDROOM - 41	38	100	Below
L02 - UD BEDROOM	29	97	Below
L02 -BEDROOM - 26	100	100	Meets
L02 -BEDROOM - 28	95	100	Meets
L02 -BEDROOM - 30	97	100	Meets
L02 -BEDROOM - 03	97	100	Meets
L02 -BEDROOM - 07	23	97	Below
L02 - PHYSIO	100	100	Meets
L02 - ACTIVITY	100	100	Meets
L02 -BEDROOM - 23	52	100	Meets
L02 -BEDROOM - 19	57	100	Meets
L02 - BEDROOM 84	52	100	Meets
L02 -BEDROOM - 05	51	100	Meets
L02 - DINING ROOM	100	100	Meets
L02 - SITTING ROOM	100	100	Meets
L02 - FAMILY ROOM	100	100	Meets
L02 - BEDROOM 11	51	100	Meets

Space Name (Real)	Method 2		Status (Meets/below IS EN 17037 - Method 2 Criteria)
	>300 Lux >50% Hours >50% Area	>100 Lux >50% Hours >95% Area	
	% Area Meeting Target	% Area Meeting Target	
L03 -BEDROOM - 64	57	100	Meets
L03 -BEDROOM - 60	54	100	Meets
L03 -BEDROOM - 56	50	100	Meets
L03 -BEDROOM - 52	50	100	Meets
L03 -BEDROOM - 48	46	100	Below
L03 -BEDROOM - 46	60	100	Meets
L03 -BEDROOM - 50	93	100	Meets
L03 -BEDROOM - 58	100	100	Meets
L03 -BEDROOM - 54	97	100	Meets
L03 -BEDROOM - 68	97	100	Meets
L03 -BEDROOM - 66	69	100	Meets
L03 -BEDROOM - 62	68	100	Meets
L03 -BEDROOM - 01	95	100	Meets
L03 -BEDROOM - 33	82	100	Meets
L03 -BEDROOM - 35	84	100	Meets
L03 -BEDROOM - 39	66	100	Meets
L03 -BEDROOM - 41	68	100	Meets
L03 - UD BEDROOM	29	100	Below
L03 -BEDROOM - 26	100	100	Meets
L03 -BEDROOM - 28	97	100	Meets
L03 -BEDROOM - 30	91	100	Meets
L03 -BEDROOM - 03	100	100	Meets
L03 -BEDROOM - 07	50	100	Meets
L03 - PHYSIO	100	100	Meets
L03 - ACTIVITY	100	100	Meets
L03 -BEDROOM - 23	62	100	Meets
L03 -BEDROOM - 19	59	100	Meets
L03 - BEDROOM 84	56	100	Meets
L03 -BEDROOM - 05	59	100	Meets
L03 - DINING ROOM	100	100	Meets
L03 - SITTING ROOM	100	100	Meets
L03 - FAMILY ROOM	97	100	Meets
L03 - BEDROOM 11	53	100	Meets

Unit 21, First Avenue, Cookstown - DAYLIGHT & SUNLIGHT

Space Name (Real)	Method 2		Status (Meets/below IS EN 17037 - Method 2 Criteria)
	>300 Lux >50% Hours >50% Area	>100 Lux >50% Hours >95% Area	
	% Area Meeting Target	% Area Meeting Target	
L04 -BEDROOM - 64	73	100	Meets
L04 -BEDROOM - 60	69	100	Meets
L04 -BEDROOM - 56	65	100	Meets
L04 -BEDROOM - 52	69	100	Meets
L04 -BEDROOM - 48	62	100	Below
L04 -BEDROOM - 46	80	100	Meets
L04 -BEDROOM - 50	85	100	Meets
L04 -BEDROOM - 58	100	100	Meets
L04 -BEDROOM - 54	90	100	Meets
L04 -BEDROOM - 68	97	100	Meets
L04 -BEDROOM - 66	100	100	Meets
L04 -BEDROOM - 62	100	100	Meets
L04 -BEDROOM - 01	97	100	Meets
L04 -BEDROOM - 33	60	100	Meets
L04 -BEDROOM - 35	100	100	Meets
L04 -BEDROOM - 39	89	100	Meets
L04 -BEDROOM - 41	78	100	Meets
L04 - UD BEDROOM	35	100	Below
L04 -BEDROOM - 26	97	100	Meets
L04 -BEDROOM - 28	100	100	Meets
L04 -BEDROOM - 30	100	100	Meets
L04 -BEDROOM - 03	100	100	Meets
L04 -BEDROOM - 07	54	100	Meets
L04 - PHYSIO	100	100	Meets
L04 - ACTIVITY	100	100	Meets
L04 -BEDROOM - 23	77	100	Meets
L04 -BEDROOM - 19	62	100	Meets
L04 - BEDROOM 84	59	100	Meets
L04 -BEDROOM - 05	66	100	Meets
L04 - DINING ROOM	100	100	Meets
L04 - SITTING ROOM	100	100	Meets
L04 - FAMILY ROOM	100	100	Meets
L04 -BEDROOM - 11	51	89	Meets

### 9.3 Appendix C – Proposed Site Shadow Analysis

#### 9.3.1 Proposed – 21 March



Figure 9: Proposed Site Shadow Analysis on March 21 @07:00 (left) @08:00 (right)

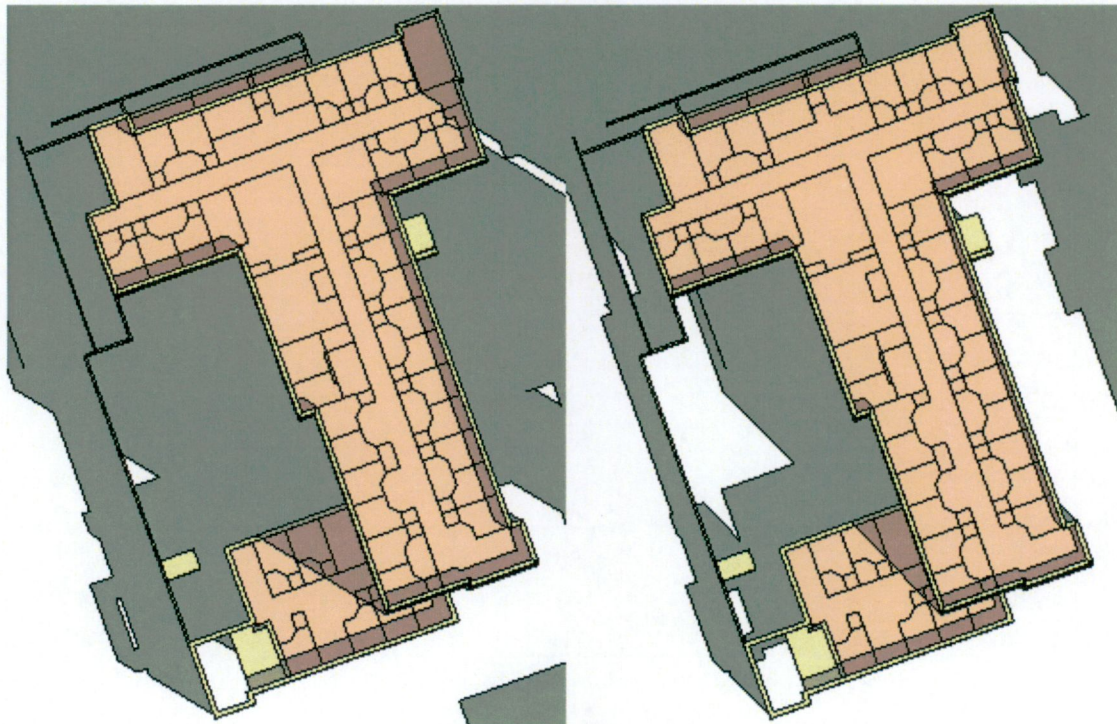


Figure 10: Proposed Site Shadow Analysis on March 21 @09:00 (left) @10:00 (right)

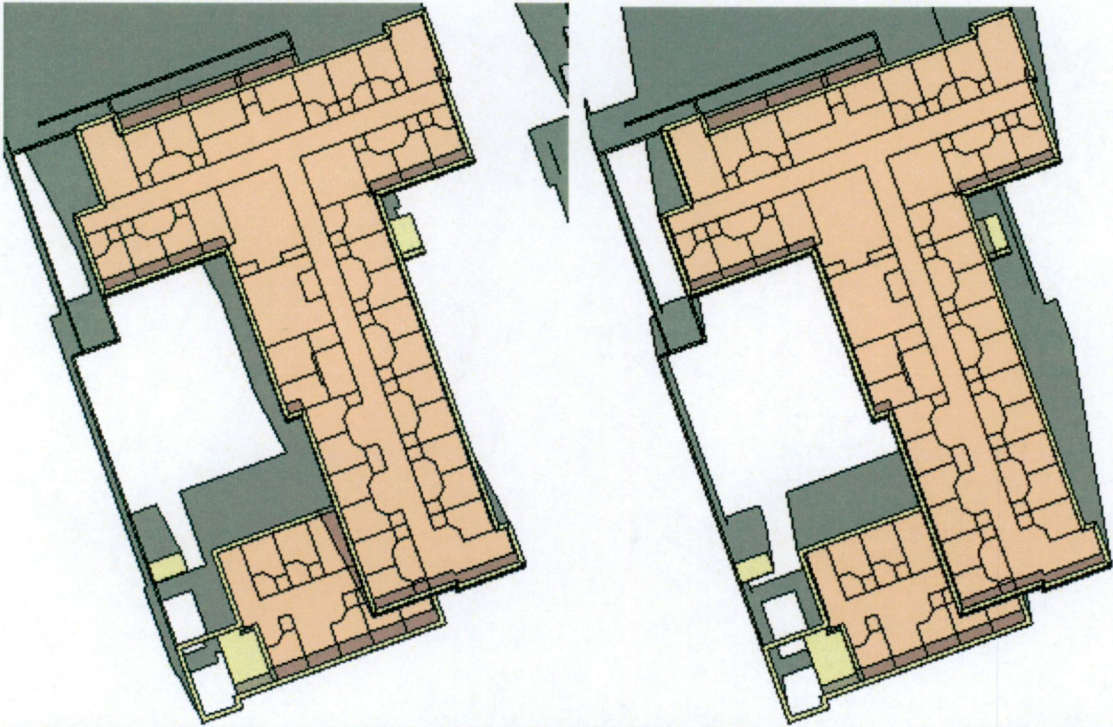


Figure 11: Proposed Site Shadow Analysis on March 21 @11:00 (left) @12:00 (right)

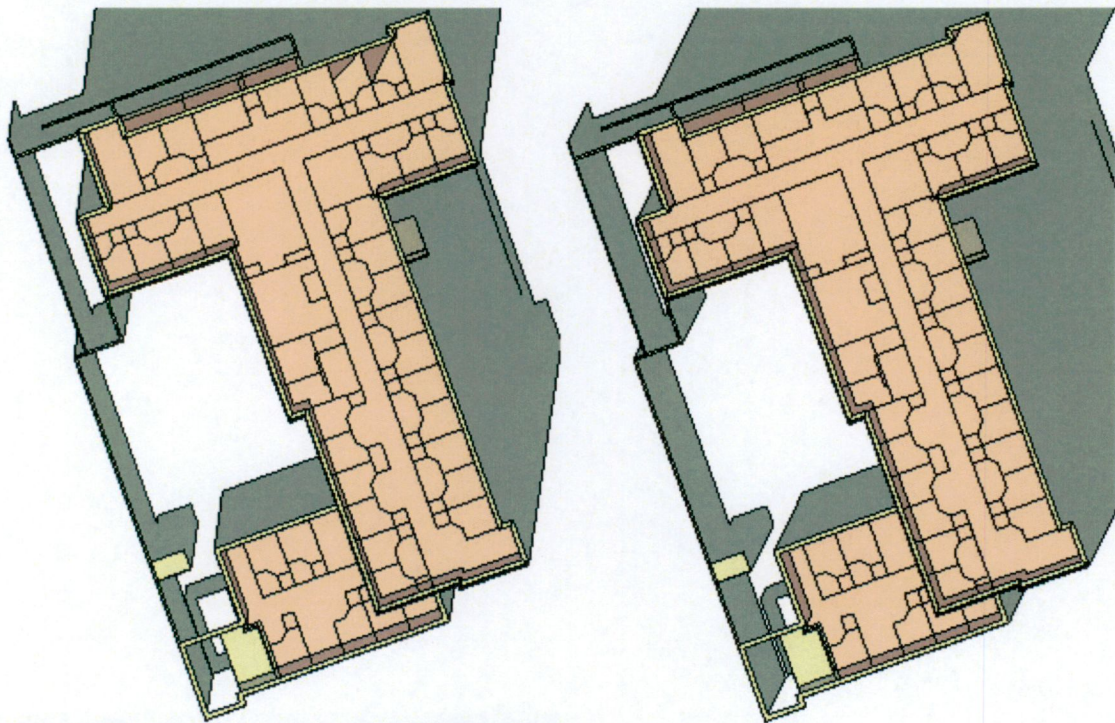


Figure 12: Proposed Site Shadow Analysis on March 21 @13:00 (left) @14:00 (right)

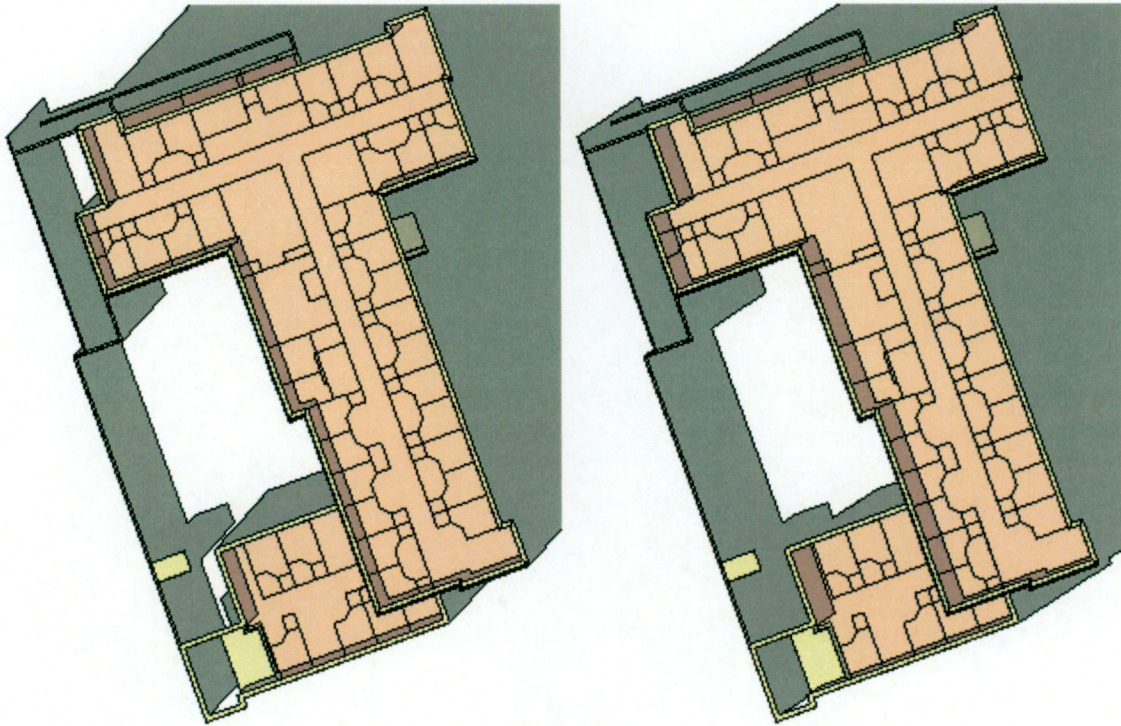


Figure 13: Proposed Site Shadow Analysis on March 21 @15:00 (left) @16:00 (right)

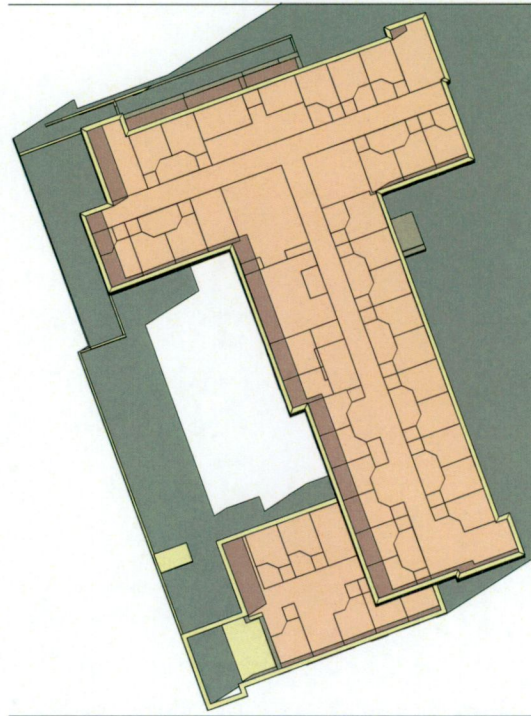


Figure 14: Proposed Site Shadow Analysis on March 21 @17:00