Proposed Residential Development at The Boylan Centre, Sussex Street, Dún Laoghaire, Co. Dublin.

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1. Introduction

Proposed demolition of community building at 10 Eblana Avenue and demolition of community and commercial building and removal of on-street parking at 10 Sussex Street. Construction of a new community facility and housing development comprising of 39nr. 1-bed apartments, 16nr. 2-bed apartments and 4nr. 3-bedroom houses and provision of 1nr. accessible parking space, an accessible drop-off area, 66nr. cycle parking spaces and all associated site works on Sussex Street and Eblana Avenue, Dún Laoghaire, Co. Dublin"

1.1 Executive Summary

This report assesses the impact of the proposed development for Daylight and Sunlight on the neighbouring buildings and the quality of daylight and sunlight within the proposed development. This analysis is carried out based on the drawings of the Architects Department, Dún Laoghaire Rathdown County Council.

The report has been prepared by John Healy - Diploma Architectural Technology, M.Sc Environmental Design of Buildings, PG Dip Digital Media. John is a Director at Digital Dimensions for the last 25 Years.

John has been working as a Daylight and Sunlight consultant for the last 15 years following completion of a Masters of Science in Environmental Design of Buildings at Cardiff University. The Masters focused on passive design strategies including daylight and sunlight optimisation. John has worked on an extensive list of projects over the years varying in scale and location from restricted city sites to urban and rural projects throughout Ireland. Some previous work include;

- Oscar Traynor Wood; 850 unit housing and apartment development for Glenveagh Homes / Dublin City Council.
- Belcamp North Dublin; 2527 unit residential scheme for Gannon Homes.
- Taylor's Lane Apartment Development; 402 units apartment development for Shannon Homes.
- Social Housing Bundles (SHB) 4&5; 17 social housing sites for the NDFA.
- No.9 -12 Dawson Street: Extension to listed office block in Dublin for Oakmount.

1.2 Assessment of Potential Impact to Daylight and Sunlight Availability on Adjacent Properties

1.2.1 Daylight to Adjacent Properties

There will be a reduction in available daylight to some of the windows of the surrounding properties. The reduction ranges from Minor to Moderate. Currently there is a single storey building facing the existing windows surrounding the site and they have a largely unobstructed access to skylight. The surrounding properties are mostly built to the boundary line with no setback, Any new development will no matter how modest in height will result in a reduction in VSC levels below the recommended targets set out in the BRE guidelines. The resultant VSC level are in line with emerging trends for built up town / city locations were buildings are built up to the boundary.

1.2.2 Sunlight to Adjacent Properties

Analysis for APSH and WPSH Section 4 indicates that there will be a minor to moderate reduction in sunlight in adjacent dwellings.

Analysis in Section 5 indicates that there will be a negligible reduction in sunlight in adjacent amenity spaces when assessed on the 21st March.

1.2.3 Conclusion

There will be a reduction to daylight and sunlight availability to a small number of the neighbouring properties. Any impact will be in line with emerging trends and building heights for urban areas.

1.3 Assessment of the Quality of Daylight and Sunlight within the Proposed Development

The residential units were designed in line with the recommendations of the BRE guidelines (2022). A number of design iterations were conducted to improve the daylight and sunlight within the proposed development. The guidelines clearly state that the targets are recommendations only and flexibility is required when setting and interpreting the targets.

The BRE guidelines (2022) recommends assessment methods set out in BS EN 17037 for daylight provision. BS EN 17037 contains a National Annex which sets out minimum daylight levels to be achieved in the UK and channel Islands. Ireland has a similar latitude and climate to the UK. The UK annex to BS EN 17037 states that the target values set out in EN 17037 Table A1 may be hard to achieve in the UK, it sets alternative minimum values for rooms to dwellings. The minimum illuminance levels set out in BS EN17037:2018+A1:2021 are: Kitchens and living spaces containing a kitchen 200lux (1.3%DF). Living rooms 150lux (1%DF) and bedrooms 100lux (DF0.7%).

The levels set out in the UK annex are used in this assessment, as the primary results to be achieved, because these are referenced in the BRE guidelines (2022), as recommended by the local authority. The BRE guidelines (2022) deals with daylight and sunlight to

adjacent properties and defers to BS EN17037:2018+A1:2021 for daylight and sunlight within the proposed development and allows for a complete assessment of the proposed development and its surroundings. The BRE guidelines (2022) presents a discussion on aspects of daylight and sunlight and interpreting the results of these assessments.

IS EN17037:2018 does not set out any guidance for assessing the impact to daylight and sunlight from a proposed development on neighbouring buildings nor is there any Irish governmental guidance on interpreting results and percentages of units to achieve the target results in multi unit developments. IS EN17037:2018 does not set out room use specific targets but instead designates a Minimum and Target lux level to be achieved in all rooms regardless of use. The function of a room historically has been the key factor in informing the design of a building and the window sizes to allow adequate daylight levels for the task typical to that room to be achieved. The lack of variance in target levels for the tasks typical to a room can lead to substantially oversized windows in rooms with a lower requirement for daylight levels, for example bedrooms. The aim to achieve the minimum target lux level to all rooms in a multi unit residential building is not practical and could lead to overheating of units that have greater access to the sky and sunlight. This could also lead to higher energy usage due to oversized windows and a balance needs to be met.

The results for the Minimum and Target levels set out in Table A1 in IS EN17037:2018 are presented in the assessment as supplementary for completeness, however, conclusions can not be made due to lack of clear guidance on interpenetration of results.

There are no existing mature trees within the vicinity of any of the proposed units that would influence the daylight levels and the assessment is carried out without any trees.

1.3.1 Assessment of Daylight in Accordance with BR209:2022 and BS EN 17037:2018+A1:2021

100% of the Living, Dining, Kitchen and Bedroom spaces within the proposed development achieve the target values set out in BS EN 17037:2018+A1:2021 Table NA1. These are the minimum values, per specified use, to be achieved in habitable rooms and meets the recommendations of the BRE guidelines (2022).

1.3.2 Sunlight within the Proposed Development

This scheme is well designed for sunlight, with 83.6% of units meeting the minimum recommended 1.5 direct sunlight hours. This is in line with the BRE guideline example for an apartment layout where 4 in 5 achieves the target sunlight hours.

The communal amenity spaces achieve sunlight levels that exceed 2 hours sunlight over 18% of the required amenity space on the 21st March. Higher sunlight levels will be achieved during spring and summer months. The scheme is located close to Dún Laoighre Harbour and The Peoples Park.

1.4 Supplementary Information - Assessment of Daylight in Accordance with IS EN 17037:2018

EN 17037:2018 sets out values for target illuminance, minimum target illuminance and fractions of reference plane to be achieved. The target and minimum target levels set out in EN17037:2018 are for any type of building; they do not take into account room use or make allowance for rooms that have a lesser requirement for daylight. The results of this assessment indicate a high level of daylight provision, with 83.3% of rooms achieving Minimum Illuminance and 58.3% achieving Target Illuminance. Appendix B identifies any rooms which do not achieve minimum illuminance or target illuminance levels.

To date there is no guidance from governmental bodies on the use or interpretation of IS EN 17037:2018. Apartment guidelines and local authorities guidelines refer to BR209 2022: “Site layout planning for daylight and sunlight” (third edition) which in turn references BS EN 17037. BS EN17037:2018+A1:2021 is the same as IS EN 17037:2018 with the addition of a National Annex (NA1) and the annex specifically refers to and sets room specific values for dwellings in the UK and Channel Islands. Therefore the assessment against IS EN 17037:2018 is included as supplementary information only, noting there are no room specific recommendations for daylight and because of this limitation, it is considered the recommendations made in the BRE guidelines (2022) are more appropriate.

Appendix 16- Sunlight and Daylight of the Dublin City Development Plan 2022-2028 gives guidance on the two daylight provision metrics as follows:
Section 3.3 BS EN 17037:2018 – Daylight in Buildings states that:*“The minimum daylight provision targets given within the national annex have relevance.”*
Section 3.4 IS EN 17037:2018 – Daylight in Buildings states that due to the lack of localisation and provision for specific guidance on individual room use that: *“These limitations make it unsuitable for use in planning policy or during planning applications. BR 209 must still be used for this purpose.“*

1.5 Conclusions

Overall the design team worked in response to the context to ensure the proposed development performs with regards to achieving the best possible daylight and sunlight quality. All habitable rooms meet the minimum standard for daylight provision as per BS EN 17037:2018+A1:2021 as referred to in the BRE guidelines BR209:2022 (third edition).

In the assessment of daylight in accordance with IS EN 17037:2018, shown for supplementary information, the majority of habitable

2. Methodology

2.1 Standards and Guidelines

Ministerial guidance is provided in Sustainable Residential Development and Compact Settlements: Guidelines for Planning Authorities (2024) Section 5.3.7(b).

> *"In cases where a technical assessment of daylight performance is considered by the planning authority to be necessary regard should be had to quantitative performance approaches to daylight provision outlined in guides like A New European Standard for Daylighting in Buildings IS EN17037:2018, UK National Annex BS EN17037:2019 and the associated BRE Guide 209 2022 Edition (June 2022), or any relevant future standards or guidance specific to the Irish context."*

The Daylight and Sunlight assessments included in this report demonstrates the level of compliance with these three documents:

- BR209:2022 Site Layout Planning for Daylight and Sunlight (third edition), also referred to as the BRE guidelines (2022).
- BS EN 17037:2018+A1:2021 Daylight in Buildings, also referred to as the UK Annex.
- IS EN 17037:2018 Daylight in Buildings.

2.2 BRE Guidance Document BR209:2022 Site Layout Planning for Daylight and Sunlight (third edition)

In its opening summary, the BRE guidelines (2022) states that the report *"is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location."* The recommendations of the BRE guidelines (2022) are not suitable for rigid application to all developments in all contexts. This is of particular importance in the context of national and local policies for the consolidation and densification of urban areas.

The BRE guidelines (2022) sets out the assessment metrics to be applied when assessing the potential impact of a development on the daylight and sunlight of neighbouring properties. This is broadly in line with the previous version of the BRE guidelines (2011). The metrics for assessing impact to neighbouring buildings for Daylight is the Vertical Sky Component (VSC) and Sunlight is the Annual Probable Sunlight Hours (APSH). Sunlight to neighbouring amenity space is assessed through the measurement of sunlight availability on the 21st March and the plotting of shadow diagrams.

When assessing the quality of interior spaces in proposed developments, the BRE guidelines (2022) Appendix C states; *"The guidance contained in this publication is intended to be used with BS EN 17037 and its UK National Annex."* The BRE guidelines (2022) also states in Section 1.7 that *"The guidance here is intended for use in the United Kingdom and in the Republic of Ireland, though recommendations in the Irish Standard IS EN 17037 may vary from those in BS EN17037."*

2.3 Daylight in Buildings EN 17037:2018

EN 17037 is a unified daylighting standard published by the European Committee for Standardization (CEN) in 2018. It is applicable across all countries within the EU including Ireland, with the Irish edition IS EN17037:2018. The standard is enacted in Britain under BS EN 17037:2018+A1:2021 with a UK National Annex for regional assessments. The daylight and sunlight assessment methods for internal daylight and sunlight provision are common to both the Irish Standard version and the UK version. The EN17037:2018 Standard deals exclusively with new developments and does not give guidance or metrics on loss of light or sunlight to existing properties.

The UK National Annex (NA) provides further recommendations for daylight provision in the UK and Channel Islands. The UK annex states that the daylight target levels in BS EN 17037:2018 Clause A.2 may be hard to achieve in buildings in the UK, in particular dwellings in urban areas with significant obstructions or tall trees outside. The UK annex sets out minimum daylight provision to be achieved in UK dwellings. Table NA.1 sets out room specific minimum values to be achieved in the UK and Channel Islands. All the rooms achieve the minimum DF factor levels set out in A1 for Bedrooms (DF0.7%), Living Rooms (1%DF) and Kitchens and Living Spaces containing a Kitchen(1.3%). The Daylight Factor percentage values are derived from minimum room specific illuminance levels set out in NA+1 and the Median External Diffuse Illuminance ($E_{v,d,med}$) for Dublin from Table A.3 EN17037:2018. The illuminance levels and corresponding DF% are given in Table 5 below.

2.4 Daylight to Existing Buildings

BRE guidelines (2022) Section 2.2.2 sets out which rooms need to be assessed for daylight.

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

A proposed development could potentially have a negative effect on the level of daylight that a neighbouring property receives, if the obstructing building is large in relation to its distance from the existing dwelling. BRE guidelines (2022) Section 2.2.4 states that *"Loss of light to existing windows need not be assessed if the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window.*" In this report, we refer to this as the 'zone of influence'.

BRE guidelines (2022) Section 2.2.23 states; *"If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected*."

If a window falls within a 45° angle both in plan and elevation with a new development in place, the window may be affected and should be assessed.

For loss of daylight the BRE guidelines (2022) recommends calculation of the Vertical Sky Component. VSC can be defined as the amount of skylight that falls on a vertical window. It is the ratio of direct sky illuminance falling on the outside window, to the simultaneous horizontal illuminance under an unobstructed sky. The standard CIE Overcast Sky is used and the ratio is usually expressed as a percentage. The maximum value is just under 40% for a completely unobstructed vertical wall. The Vertical Sky Component on a window is a good measure of the amount of daylight entering it.

The BRE guidelines (2022) recommend one of two criteria is met when assessing for the Vertical Sky Component;

a) Where the Vertical Sky Component at the centre of the existing window exceeds 27% with the new development in place then enough sky light should still be reached by the existing window.

b) Where the Vertical Sky Component with the new development in place is both less than 27% and less than 0.8 times its former value, then the area lit by the window is likely to appear more gloomy, and electric light will be needed more of the time.

The BRE guidelines (2022) state that if the VSC is:

- At least 27%, then conventional window design will usually give reasonable results;
- Between 15% and 27%, then special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight;
- Between 5% and 15%, then it is very difficult to prove adequate daylight unless very large windows are used;
- Less than 5%, then it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed

This report assesses the percentage of direct sky illuminance that falls on the centre point of neighbouring windows that could be affected by the proposed development through the Vertical Sky Component (VSC) as per the methodologies contained in the BRE guidelines (2022).

2.5 Sunlight to Existing Buildings

The BRE guidelines (2022) recommend assessing the main living rooms and conservatories if they have a window wall facing within 90° of due south. Kitchens and bedrooms are less important but care should be taken not to block too much sun. If the proposed development is fully north of the existing window then sunlight need not be assessed.

The Annual Probable Sunlight Hours (APSH) is used to assess the quantity of sunlight for a given location. This is the total amount of sunshine for a given location on an unobstructed horizontal surface taking cloud cover into account. Statistical data from the Irish Meteorological Service is used to assess the APSH and the Winter Probable Sunlight Hours (taken to fall between the 21st of September and the 21st of March).

Table 1 below shows the average sunlight hours for each month and the maximum possible without any cloud cover. This gives the factor of possible sunlight hours for each month.

Met Éireann Sunlight Hours Data Set 1991-2020													
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Average Sunlight Hours/ Day	1:54	2:54	3:42	5:24	6:24	6:00	5:17	5:00	4:24	3:24	2:24	1:42	
Average Sunlight Hours/ Month	58:54	81:12	114:42	162:00	198:24	180:00	163:47	155:00	132:00	105:24	72:00	52:42	1449.1
Total Available Sunlight Hours	252	265	358	412	483	485	496	451	375	320	250	236	4383
Probable Sunlight Hours Ratio	23.4%	30.6%	32.9%	39.3%	41.1%	37.1%	33.0%	34.4%	35.2%	32.9%	16.8%	22.3%	33.1%

Table 1: Average monthly sunlight hours recorded at Dublin Airport - Data set 1991-2020

The BRE guidelines (2022) recommend that the centre of a window or 1.6m above ground for a door be assessed and it should receive at least 25% of the APSH and it should receive at least 5% during the period of 21st September to 21st March. If the available APSH is less than this then it should not be reduced below 0.8 times its former value or noticeable loss of sunlight may occur.

2.6 Sunlight to Gardens and Open Spaces

For calculations of sunlight analysis it is general practice to use March 21st. The BRE guidelines (2022) Section 3.3.17 states:

> *"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."*

2.7 BRE Guidelines (2022) Appendix G: Calculations of Trees & Hedges

Trees are not usually included in the assessments of impact on neighbouring properties, unless specified otherwise. In relation to the effects of trees and hedges the BRE guidelines (2022) Section G1.2 states;

> *"It is generally more difficult to calculate the effects of trees on daylight because of their irregular shape and because some light will generally penetrate through the crown. Where the effects of a new building on existing buildings nearby is being analysed, it is usual to ignore the effects of existing trees. This is because daylight is at its scarcest and most valuable in winter when most trees will not be in leaf."*

The BRE guidelines (2022) recommends that sometimes trees should be taken into account for the proposed development where the new development is proposed near large existing trees. This needs to be done by modelling a representative of the existing trees. Reflectance and transparency should be taken into account. Table G1 in BR209:2022 gives values for transparencies of tree crowns in summer and winter for deciduous trees, dense evergreen can be assessed as opaque. Table G2 gives general reflectance values for shades of trees.

2.8 BRE Guidelines (2022) Appendix H: Environmental Impact Assessment

The BRE guidelines sets out criteria for classification for assessment of impact where a new development affects a number of existing buildings or open spaces in relation to an Environmental Impact Assessment. The guide does not give a specific range or percentages but sets out parameters as set out below.

> *"Where the loss of skylight or sunlight fully meets the guidelines in this book, the impact is assessed as negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space lose light (within the guidelines), a classification of negligible impact is more appropriate. Where the loss of light is only just within the guidelines, and a larger number of windows or open space area are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight and sunlight in the affected building or open space.*
>
> *Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or major adverse. Factors tending towards a minor adverse impact include:*
>
> - *only a small number of windows or limited area of open space are affected*
> - *the loss of light is only marginally outside the guidelines*
> - *an affected room has other sources of skylight or sunlight*
> - *the affected building or open space only has a low level requirement for skylight or sunlight*
> - *there are particular reasons why an alternative, less stringent, guideline should be applied.*
>
> *Factors tending towards a major adverse impact include:*
>
> - *a large number of windows or large area of open space are affected*
> - *the loss of light is substantially outside the guidelines*
> - *all the windows in a particular property are affected*
> - *the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight, e.g. a living room in a dwelling or a children's playground.*
>
> *Beneficial impacts occur when there is a significant increase in the amount of skylight and sunlight reaching an existing building where it is required, or in the amount of sunlight reaching an open space.*
>
> *Beneficial impacts should be worked out using the same principles as adverse impacts. Thus a tiny increase in light would be classified as a negligible impact, not a minor beneficial impact."*

The BRE guidelines does not set out a specific value range for the different classification of impact level of Minor, Moderate and Major to each window. For the purpose of this report one of five classification levels will be applied:

Imperceptible:	There is no reduction in the VSC levels or where the levels are 95% of the existing value.
Negligible:	A reduction in the VSC level but it retains a VSC >27% or <27% but >80% of the existing value.
Minor reduction:	VSC below 27% but greater than 20%, or ratio greater than 65% of the existing value.
Moderate reduction:	VSC below 20% but greater than 10%, or ratio greater that 50% of the existing value.
Major reduction:	VSC below 10% or ratio less than 50% of the existing value.

A flexible approach should be taken when assessing the impact with daylight and sunlight being one of many factors that influence the environment when planning a new development. The evaluation of the impact should be considered in conjunction with other factors when determining the overall impact level to a property.

2.9 Assessment Model Parameters

The BRE guidelines (2022) recommends surface reflectances should represent real conditions and where reflectance values have not been measured or specified default values are set out in Table C4 of the guidance document. The surface reflectances have been specified and are set out in Table 2 below. This table also shows the input values for material used and additional assessment model input parameters.

Input Values for Assessment Model			
Surface Reflectance			
Element	Reflectance	Transmittance	Material Description
Internal walls	80%	0%	White Painted Walls
Internal ceiling	80%	0%	White Painted Ceiling
Floor - light wood	40%	0%	Light wood Flooring
External walls - proposed development	50%	0%	Brick
External walls - outside site	50%	0%	CIBSE
External ground	20%	0%	CIBSE
Glass		68%	Triple glazed clear glass
Maintenance Factor for Glass		Assessment Plane	
Suburban Vertical no overhang	0.96	Sensor Grid spacing	0.3m
Suburban Vertical sheltered by balcony or overhang	0.88	Sensor grid inset	0.35m
Framing Factor: Patio Doors	0.77	Minimum inset	0.3m
		Work plane offset	0.85m

Table 2: Surface reflectance parameters and input values for model calculations

2.10 Daylight in the Proposed Development.

The BRE guidelines (2022) Appendix C sets out interior daylight recommendations, it states; “BS EN 17037 supersedes BS8206 Part 2 ‘Code of practice for daylighting’ which contained a method of assessment based on Average Daylight Factor, which is now no longer recommended.”

BS EN 17037 sets out two methods for assessing daylight provision in proposed buildings. One method is called the **Illuminance method.** This is based on Target illuminances for daylight to be achieved across specified fractions of a reference plane at working plane height (0.85m) for half the daylight hours in a year. The Illuminance Method requires the use of a suitable weather file with local climate conditions and takes into account the orientation of the space.

The alternative method is called the **Daylight Factor Method.** This method is based on calculating the daylight factors achieved over specific fractions of a reference plane. The Daylight factor is the illuminance at a point on a reference plane in a space, divided by the illuminance on an unobstructed horizontal surface outdoors. This method uses an overcast sky for calculation and the assessment of the space is orientation independent. BS EN 17037 gives the Median External Diffuse Illuminance (Ev,d,med) for the capital cities throughout Europe to account for external local illuminance levels.

The UK committee formed the opinion that the Target Illuminance recommendations in Clause A.2 of BS EN 17037 may not be achievable for some buildings, particularly dwellings. The UK committee believes this could be the case for dwellings with basement rooms or those with significant external obstructions. In BS EN 17037:2018+A1:2021, the UK National Annex (NA) sets out additional minimum room specific Target Daylight Factor values for the UK. Clause NA.2 sets out illuminance values to be exceeded over at least 50% of the points on a reference plane 0.85m above the floor for at least half the daylight hours.

EN 17037:2018 sets out values for Minimum and Target levels to be achieved with a minimum, medium and high compliance level for each. The guideline recommends that the minimum level should be achieved for both target levels but it does not give guidance on the number of units or fraction within a multiple residential unit development that should achieve these values. Additionally it does not differentiate between room use and weighted targets for rooms which would have a lesser requirement. The UK annex sets out factors for UK specific settings where it is difficult to achieve natural daylighting.

The compliance calculation is based on an annual, climate-based simulation of interior illuminance distributions. The BRE guidelines (2022) refers to this method as the Illuminance Method. For each hour of the year, the percentage of the floor area achieving minimum and target illuminance thresholds are measured on a room-by-room basis. Two target types are set with the following criteria:

- Target Illuminance: 300 lux over 50% of floor area for at least 50% of daylight hours.
- Minimum Illuminance: 100 lux over 95% of floor area for at least 50% of daylight hours.

BS EN 17037 gives three levels of recommendation for daylight provision in an interior space: Minimum, Medium and High. The BRE guidelines (2022) Section C3 recommends for compliance with the standard, a space should achieve the Minimum level.

Daylight hours are defined as the 4380 hours with the most diffuse horizontal illuminance in the weather file. In addition to this baseline (Minimum) requirement, rooms can achieve Medium and High levels of compliance by meeting higher illuminance thresholds, as outlined in the table below:

Target Illuminance From Daylight Over At Least Half The Daylight Hours		
Level of recommendation	Target illuminance E_T(lx) for half of the assessment grid	Minimum illuminance E_{TM}(lx) for 95% of the assessment grid
Minimum	300 lux	100 lux
Medium	500 lux	300 lux
High	750 lux	500 lux

Table 3: IS / BS EN 17037:2018 Target Illuminance from Daylight over at least half the daylight hours.

Target Daylight Factor (D) for Dublin*		
Level of recommendation	Target daylight factor D for half of the assessment grid	Minimum daylight factor D for 95% of the assessment grid
Minimum	2%	0.7%
Medium	3.5%	2%
High	5%	3.5%

Table 4: IS / BS EN 17037:2018 Target Daylight Factor (D) for Dublin.

Target Minimum Daylight Factor (D) for Dublin* based on UK National Annex		
Room Type	Target illuminance E_T(lx) for half of the assessment grid	Target daylight factor D from Table A.3 EN17037 $E_{v,d,med}$ for Dublin -14,900
Bedroom	100 lux	0.7%
Living Room	150 lux	1%
Kitchen	200 lux	1.3%

* EN17037 uses the latitude of the capital city of each European country to set individual values for daylight and sunlight metrics for use in setting the target levels to be achieved in a particular country.

Table 5: BS EN 17037:2018+A1:2021 Target Illuminance levels and Daylight Factor (D) for Dublin.

2.11 Sunlight within Proposed Developments

The BRE guidelines (2022) Section 3.1.7 states:

> *"that for large residential developments the overall sunlight potential can be initially assessed by counting the number of windows facing south, east and west and the aim should be to minimise the number of living rooms facing solely north, north-east or north-west unless there is some compensating factor such as an appealing view to the north."*

In Section 3.1.8 the guideline acknowledges that it may not be possible to have every living room facing within 90° of south in large developments, however, it recommends maximising the number of units with a southerly aspect.

The BRE guidelines (2022) Section 3.1.10 recommends that BS EN 17037 should be used to assess for interior access to direct sunlight. BS EN 17037 Table A.6 sets recommendations for access to sunlight and notes three levels of achievement; Minimum, Medium and High. In dwellings at least one habitable room, preferably a living room, should achieve the Minimum of 1.5 direct hours on a specified date between 1st February and 21st March, with a cloudless sky. This assessment uses the 21st March. The guidelines recommend a time step of 5 minutes or less for the assessment interval. The Minimum level to achieve is 1.5, the Medium level is 3 hours and the High level is 4 hours direct sunlight.

3. Daylight in Neighbouring Buildings

3.1 Site Overview

This proposed development is in a dense urban plot, with street boundaries on Sussex Street and Eblana Avenue, Dún Laoghaire, Co. Dublin.

The neighbouring buildings that have been identified as residential are No.s 1 - 4 Sussex Street, No.5 Sussex Street, No.11 & 12 Eblana Avenue and No.12 Sussex Street. The use of the former nurses home to the west, is unknown. However it has the potential to have a residential use and has been selected for detailed assessment.

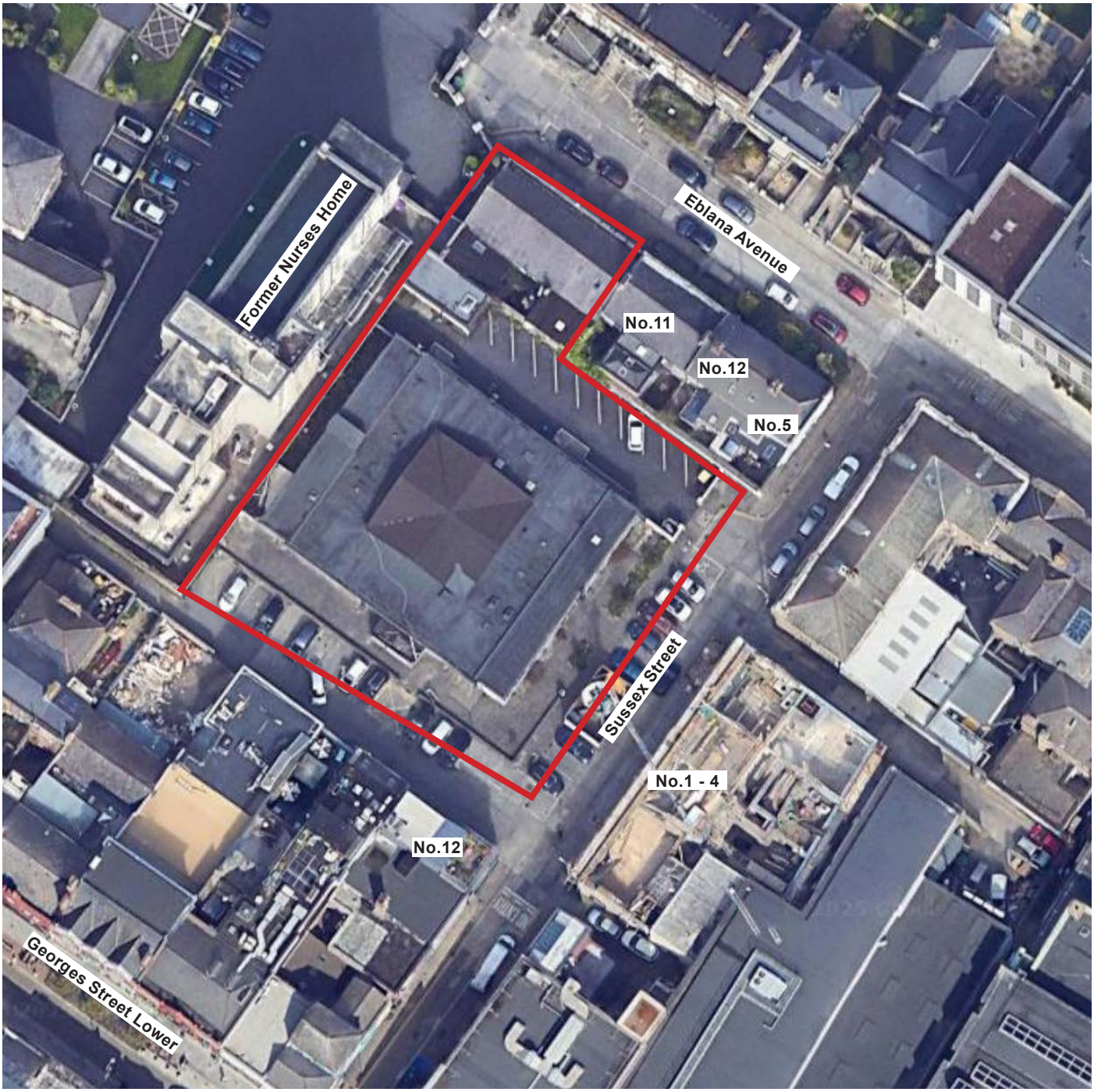


Figure 1: Indicative view of the site, taken from Google Maps.
Please refer to architectural drawings for statutory boundaries.

Figure 2: Proposed site plan

3.2 Detailed Assessment to Adjoining Dwellings

The BRE guidelines BR209:2022 (third edition) recommend assessing the Vertical Sky Component (VSC) to adjacent properties. Annual Probable Sunlight Hours (APSH) will also be assessed, where that is relevant.

The BRE guidelines recommends that if a window retains a VSC in excess of 27% with the proposed development in place then it will still receive enough daylight. If the existing VSC is below 27% or is reduced below 27% and below 0.8 times its former value then the diffuse light maybe adversely affected.

Test points locating these windows are shown in Figures 3 - 6, the results are shown in Tables 6 - 10.

Assessment is shown in Figure 5 and Table 7.

3.3 No.1 - 4 Sussex Street

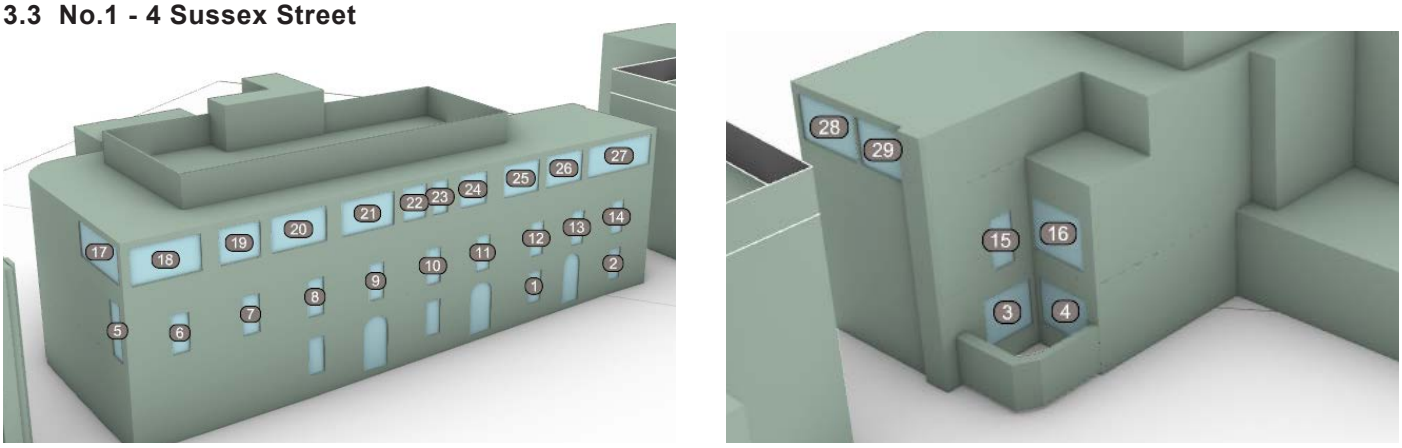


Figure 3: No.1 - 4 Sussex Street - View of model locating VSC test points

Vertical Sky Component to No.1 - 4 Sussex Street						
Location	Vertical Sky Component Recommended Value > 27%		Ratio: Proposal to Existing Recommended > 80%		Meets criteria if >27% VSC or <27% but >80% Existing Value	Comment
	Existing %	Proposed %		Average Ratio		
1	32.2	17.3	53.7%		N	Moderate Reduction
2	30.9	20.5	66.3%	* Avg 94.2%	N(*Y)	Minor Reduction
3	24.4	24.4	100.0%	* Avg 94.2%	Y	Imperceptible
4	16.6	16.6	100.0%	* Avg 94.2%	Y	Imperceptible
5	24.7	23.7	95.6%	* Avg 78.1%	Y	Imperceptible
6	34.4	16.4	47.6%	* Avg 78.1%	N	Minor Reduction
7	34.5	15.3	44.4%		N	Moderate Reduction
8	34.5	14.9	43.2%		N	Moderate Reduction
9	34.5	15.2	44.0%		N	Moderate Reduction
10	34.5	16.0	46.2%		N	Moderate Reduction
11	34.5	17.4	50.4%		N	Moderate Reduction
12	34.3	19.8	57.7%		N	Moderate Reduction
13	34.1	22.1	64.9%		N	Minor Reduction
14	33.7	23.6	70.0%	* Avg 93.7%	N	Minor Reduction
15	27.4	27.4	100.0%	* Avg 93.7%	Y	Negligible
16	20.7	20.7	100.0%	* Avg 93.7%	Y	Negligible
17	34.7	33.9	97.6%	* Avg 86.8%	Y	Negligible
18	36.5	20.2	55.1%	* Avg 86.8%	N(*Y)	Minor Reduction
19	36.5	18.9	51.8%		N	Moderate Reduction
20	36.6	18.6	50.7%		N	Moderate Reduction
21	36.7	18.7	50.9%		N	Moderate Reduction
22	36.7	19.1	51.9%		N	Moderate Reduction
23	36.4	19.3	53.0%		N	Moderate Reduction
24	36.8	20.6	55.9%		N	Minor Reduction
25	37.0	22.6	61.2%		N	Minor Reduction
26	37.1	25.0	67.4%		N	Minor Reduction
27	37.2	27.9	75.0%	* Avg 88.0%	Y	Negligible
28	30.4	30.4	100.0%	* Avg 88.0%	Y	Negligible
29	28.2	28.2	100.0%	* Avg 88.0%	Y	Negligible

* The BRE guidelines recommend where there are more than one window to a room the cumulative area weighted average can be used

Table 6: Vertical Sky Component

3.3.1 Conclusion of Potential Impact to Existing Windows

There will be a reduction in available daylight to some of the windows at 1-4 Sussex Street. The reduction ranges from Minor to Moderate. Currently there is a single storey building facing the existing windows and they have a largely unobstructed access to skylight. The resultant VSC level are in line with emerging trends for built up town / city locations were buildings are built up to the boundary.

3.4 No.12 Sussex Street

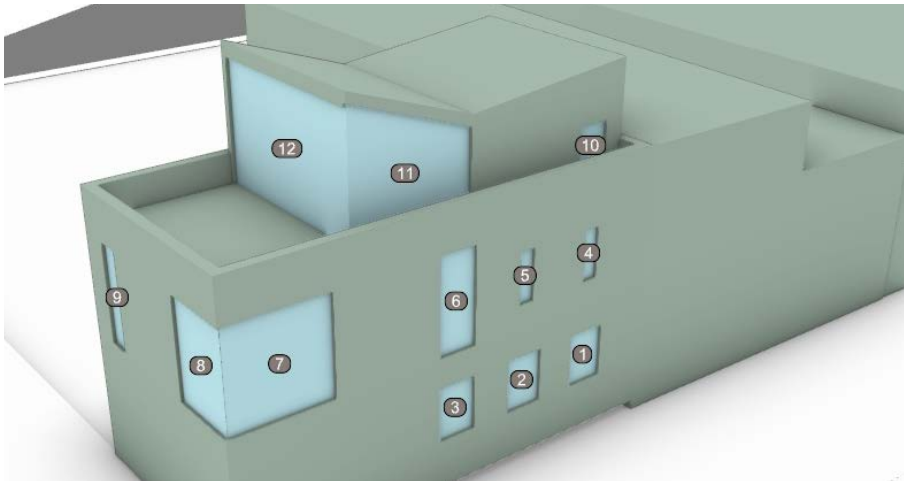


Figure 4: No.12 Sussex Street - View of model locating VSC test points

Vertical Sky Component to No.12 Sussex Street						
Location	Vertical Sky Component Recommended Value > 27%		Ratio: Proposal to Existing Recommended > 80%		Meets criteria if >27% VSC or <27% but >80% Existing Value	Comment
	Existing %	Proposed %		Average Ratio		
1	32.2	8.6	26.6%	* Avg 30.4%	N	Major Reduction
2	32.1	10.9	34.1%	* Avg 30.4%	N	Moderate Reduction
3	31.8	14.0	44.0%		N	Moderate Reduction
4	32.3	8.4	26.1%		N/A	Non habitable room
5	32.2	11.1	34.4%	* Avg 73.7%	N	Minor/ Moderate Reduction
6	34.3	16.2	47.3%	* Avg 73.7%	N	Minor/ Moderate Reduction
7	34.1	21.4	62.8%	* Avg 73.7%	N	Minor/ Minor Reduction
8	28.6	28.6	100.0%	* Avg 73.7%	Y	Imperceptible
9	25.1	25.1	100.0%	* Avg 73.7%	Y	Imperceptible
10	35.3	11.9	33.6%		N	Moderate Reduction
11	36.8	21.2	57.6%	* Avg 84.5%	N	Minor Reduction
12	36.4	36.4	100.0%	* Avg 84.5%	Y	Imperceptible

* The BRE guidelines recommend where there are more than one window to a room the cumulative area weighted average can be used

Table 7: Vertical Sky Component

3.4.1 Conclusion of Potential Impact to Existing Windows

There will be a reduction in available daylight to some of the windows at 12 Sussex Street. The reduction ranges from Major to Moderate. Currently there is a single storey building facing the existing windows and they have a largely unobstructed access to skylight. Window ID 1 which has a major reduction is to a bedroom with a second window ID 2. The bedroom is shallow at 3m. The VSC assessment does not take aperture size or room layout into account. This factor along with the room use as a bedroom indicate that the impact of the reduction is less and a moderate to minor impact is more appropriate. The overall impact would be minor. Windows 5-9 are all to the main living space with mezzanine. Window ID10 belongs to a utility space and would have a low requirement for daylight. The resultant VSC level are in line with emerging trends for built up town / city locations were buildings are built up to the boundary.

3.5 No.5 Sussex Street and No.11 - 12 Eblana Avenue

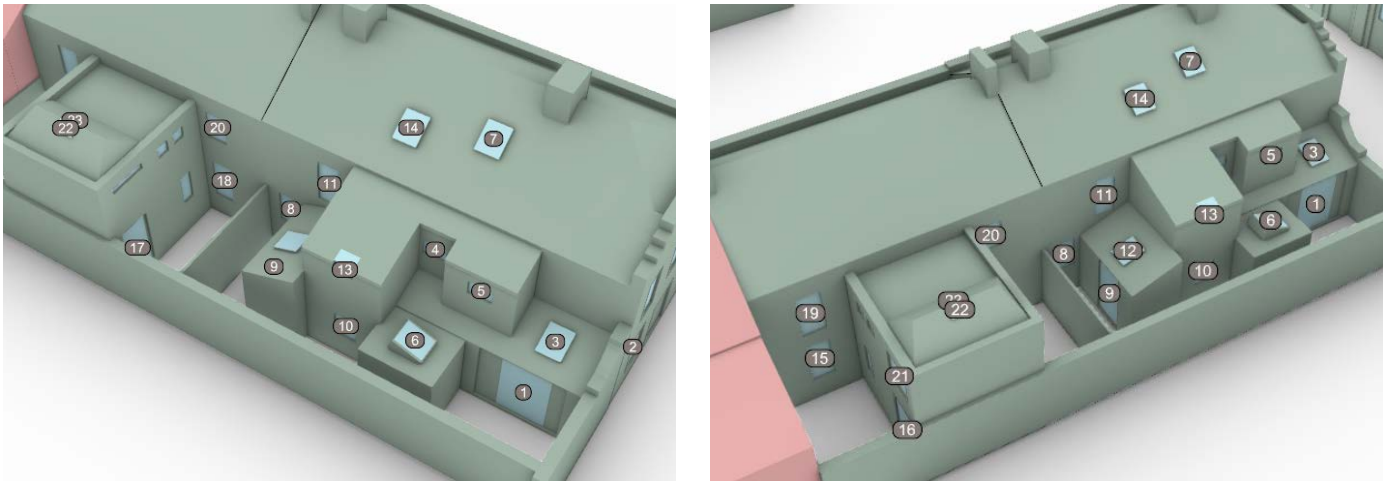


Figure 5: No.5 Sussex Street and No.11 - 12 Eblana Avenue - View of model locating VSC test points

Vertical Sky Component to No.5 Sussex Street & No.11 - 12 Eblana Avenue					
Location	Vertical Sky Component Recommended Value > 27%		Ratio: Proposal to Existing Recommended > 80%	Meets criteria if >27% VSC or <27% but >80% existing value	Comment
	Existing %	Proposed %			
1	21.6	14.7	68.0%	N	Minor Reduction
2	18.0	18.0	100.0%	Y	Imperceptible
4	21.7	13.3	61.2%	N	Moderate Reduction
5	32.0	19.3	60.3%	N	Moderate Reduction
8	22.1	8.0	36.3%	N	Major Reduction
9	12.3	9.3	75.6%	N	Minor Reduction
10	17.2	8.1	47.5%	N	Major Reduction
11	29.0	11.5	39.6%	N	Moderate Reduction
15	15.1	11.0	72.9%	N	Minor Reduction
16	11.2	17.3	154.2%	Y	Imperceptible
17	16.1	15.5	95.8%	Y	Imperceptible
18	18.1	6.9	38.0%	N	Major Reduction
19	27.5	14.4	52.5%	N	Moderate Reduction
20	27.8	11.7	42.0%	N	Moderate Reduction
21	26.7	27.4	102.6%	Y	Imperceptible

Table 8: Vertical Sky Component

3.5.1 Roof-lights

There are some roof-lights in these structures. The assessment of windows that are not in the vertical plane differs as there is no percentage for an established obstructing angle; the target for VSC of 27% does not apply. The BRE guidelines states:

> *If the value with the new development in place is less than 0.80 times the value before, there would be a noticeable reduction in the light entering the roof-light.*

Sky Component to Roof lights in No.5 Sussex Street & No.11 - 12 Eblana Avenue					
Location	Sky Component		Ratio: Proposal to Existing Recommended > 80%	Meets criteria if >80% existing value	Comment
	Existing %	Proposed %			
3	67.3	56.3	83.7%	Y	Negligible
6	75.4	66.7	88.4%	Y	Negligible
7	85.5	74.8	87.5%	Y	Negligible
12	68.8	53.7	78.0%	N	Minor Reduction
13	33.9	14.7	43.3%	N	Minor Reduction
14	85.9	72.4	84.3%	Y	Negligible
22	81.9	54.1	66.1%	N	Minor Reduction
23	78.6	76.0	96.8%	Y	Negligible

Table 9: Sky Component to Roof lights

3.5.2 Conclusion of Potential Impact to Existing Windows

There will be a reduction in available daylight to some of the windows at No.5 Sussex Street and No.11 - 12 Eblana Avenue. The reduction ranges from Minor to Moderate. Currently there is a single storey building facing the existing windows and they have a largely unobstructed access to skylight. The resultant VSC level are in line with emerging trends for built up town / city locations were buildings are built up to the boundary.

3.6 Former Nurses Home, Eblana Avenue

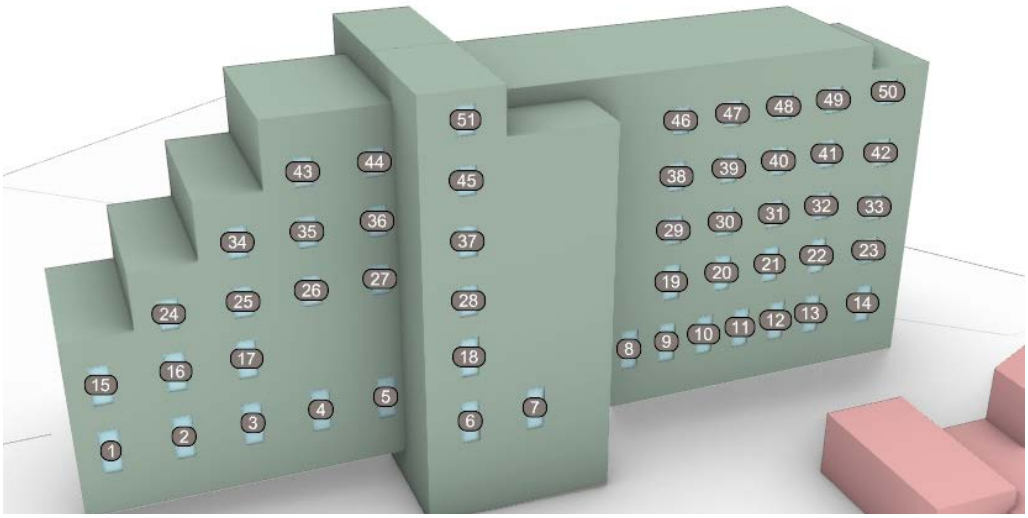


Figure 6: Former Nurses Home, Eblana Avenue - View of model locating VSC test points

Vertical Sky Component- Former Nurses Home					
Location	Vertical Sky Component Recommended Value > 27%		Ratio: Proposal to Existing Recommended > 80%	Meets criteria if >27% VSC or <27% but >80% existing value	Comment
	Existing %	Proposed %			
1	36.5	23.2	63.5%	N	Minor Reduction
2	36.2	20.4	56.4%	N	Minor Reduction
3	35.3	18.2	51.6%	N	Moderate Reduction
4	32.6	15.7	48.1%	N	Moderate Reduction
5	23.1	9.6	41.7%	N	Major Reduction
6	36.6	17.7	48.3%	N	Moderate Reduction
7	36.5	19.4	53.1%	N	Moderate Reduction
8	29.4	21.8	74.1%	N	Minor Reduction
9	33.2	24.4	73.7%	N	Minor Reduction
10	34.8	26.0	74.7%	N	Minor Reduction
11	35.4	27.2	76.7%	Y	Negligible
12	35.7	28.1	78.7%	Y	Negligible
13	35.7	28.9	81.0%	Y	Negligible
14	35.4	30.0	84.7%	Y	Negligible
15	37.9	25.2	66.4%	N	Minor Reduction
16	37.5	22.5	60.0%	N	Minor Reduction
17	36.6	20.4	55.8%	N	Minor Reduction
18	38.0	20.7	54.4%	N	Minor Reduction
19	34.8	27.1	78.0%	Y	Negligible
20	36.7	29.1	79.4%	Y	Negligible
21	37.3	30.4	81.5%	Y	Negligible
22	37.6	31.5	83.6%	Y	Negligible
23	37.5	32.1	85.7%	Y	Negligible
24	37.9	24.3	64.2%	N	Minor Reduction
25	36.9	22.6	61.2%	N	Minor Reduction
26	34.2	20.6	60.2%	N	Minor Reduction
27	24.1	13.5	55.7%	N	Moderate Reduction
28	38.2	23.6	61.6%	N	Minor Reduction
29	35.4	29.3	82.7%	Y	Negligible
30	37.3	31.3	83.9%	Y	Negligible
31	37.9	32.4	85.5%	Y	Negligible
32	38.1	33.2	87.1%	Y	Negligible
33	38.1	33.7	88.5%	Y	Negligible
34	37.2	25.7	69.2%	N	Minor Reduction

Vertical Sky Component- Former Nurses Home					
Location	Vertical Sky Component Recommended Value > 27%		Ratio: Proposal to Existing Recommended > 80%	Meets criteria if >27% VSC or <27% but >80% existing value	Comment
	Existing %	Proposed %			
35	34.5	23.9	69.3%	N	Minor Reduction
36	24.2	16.1	66.4%	N	Minor Reduction
37	38.3	27.2	70.9%	Y	Negligible
38	36.1	31.7	87.8%	Y	Negligible
39	37.7	33.4	88.7%	Y	Negligible
40	38.2	34.3	89.9%	Y	Negligible
41	38.4	34.9	91.0%	Y	Negligible
42	38.4	35.3	91.9%	Y	Negligible
43	35.4	28.5	80.7%	Y	Negligible
44	24.8	19.6	78.9%	N	Minor Reduction
45	38.3	31.2	81.6%	Y	Negligible
46	37.4	34.9	93.2%	Y	Negligible
47	38.1	35.6	93.4%	Y	Negligible
48	38.3	36.0	94.0%	Y	Negligible
49	38.4	36.3	94.7%	Y	Negligible
50	38.4	36.7	95.5%	Y	Negligible
51	38.3	35.3	92.3%	Y	Negligible

Table 10: Vertical Sky Component

3.6.1 Conclusion of Potential Impact to Existing Windows

There will be a reduction in available daylight to some of the windows at the former nursing home. The current use of the facility is not know, however, the previous use would be mostly sleeping accommodation which has a lesser requirement for daylight. The reduction ranges from Minor to Moderate. Currently there is a single storey building facing the existing windows and they have a largely unobstructed access to skylight. The resultant VSC level are in line with emerging trends for built up town / city locations were buildings are built up to the boundary.

4. Sunlight in Neighbouring Buildings

4.1 Sunlight in Neighbouring Dwellings (Annual Probable Sunlight Hours)

The BRE guidelines BR209:2022 (third edition) recommends assessing window walls for the APSH that face within 90º of due south. The guidelines state that;

> *" In housing the main requirement for sunlight is living rooms, where it is valued at any time of day, but especially in the afternoon. Sunlight is also required in conservatories. It is viewed as less important in bedrooms and in kitchens, where people prefer it in the morning rather than the afternoon."*

For a proposed development to have a noticeable impact on the annual Probable Sunlight Hours the value need to be reduced below the recommended 25% annual or 5% in the winter period from September to March. If the value is either below this to begin with or is reduced below this then it should not be reduced below 0.8 times its former value.

The BRE guidelines states that obstruction to sunlight may become an issues if

- Some part of a new development is situated within 90° of due south of a main window wall of an existing building

- In the section drawn perpendicular to this existing window wall, the new development subtends an angle greater than 25° to the horizontal measured from the centre of the lowest window to a main living room.

The windows identified that face within 90° of due south, are in No.5 Sussex Street, No.11 - 12 Eblana Avenue and the former nursing home are assessed regardless of use. The windows are identified in Figures 7 & 8; the results are set out in the Tables 11 & 12 below.

4.2 5 Sussex Street , 11-12 Eblana Avenue

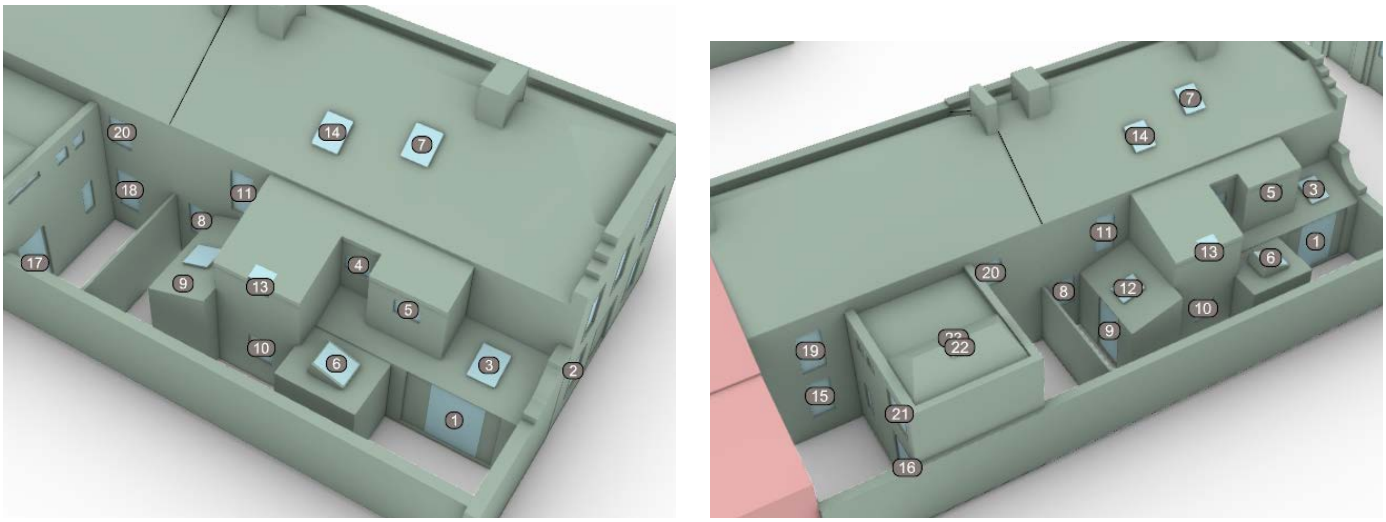


Figure 7: No.5 Sussex Street & No.11-12 Eblana Avenue - View of model locating APSH test points

Annual Probable Sunlight Hours								
	APSH >25% Target			Sept 21 - Mar 21 WPSH >5% Target			Meets criteria of >25% APSH and >5% WPSH Or <25% or <5% WPSH but retains >80% existing value	
Location ID	Existing	Proposed	Ratio	Existing	Proposed	Ratio		
	% of APSH	% of APSH	If less than 25% APSH Target >80%	% WPSH	% WPSH	If less than 5% WPSH Target >80%	APSH	WPSH
1	32.6%	22.0%	67.5%	2.4%	2.4%	100.0%	N	Y
2	27.6%	27.6%	100.0%	5.2%	5.2%	100.0%	Y	Y
3	59.5%	39.9%	67.1%	15.9%	10.5%	66.4%	Y	Y
4	36.6%	23.5%	64.2%	14.1%	9.1%	64.5%	N	Y
5	59.3%	37.9%	63.9%	20.6%	13.7%	66.4%	Y	Y
6	63.2%	39.3%	62.2%	16.8%	11.2%	66.4%	Y	Y
7	80.2%	59.6%	74.3%	27.4%	18.3%	66.7%	Y	Y
8	31.2%	8.4%	26.9%	6.2%	0.1%	1.6%	N	N
10	27.0%	14.3%	53.2%	0.9%	0.9%	100.0%	N	Y
11	45.6%	14.9%	32.7%	13.5%	1.1%	8.3%	N	N
12	49.2%	13.2%	26.8%	17.2%	3.2%	18.5%	N	N
13	62.1%	31.6%	50.9%	22.5%	11.6%	51.6%	Y	Y

Annual Probable Sunlight Hours								
	APSH >25% Target			Sept 21 - Mar 21 WPSH >5% Target			Meets criteria of >25% APSH and >5% WPSH Or <25% or <5% WPSH but retains >80% existing value	
Location ID	Existing	Proposed	Ratio	Existing	Proposed	Ratio		
	% of APSH	% of APSH	If less than 25% APSH Target >80%	% WPSH	% WPSH	If less than 5% WPSH Target >80%	APSH	WPSH
14	79.7%	54.7%	68.7%	27.4%	15.5%	56.6%	Y	Y
15	17.6%	10.8%	61.5%	4.6%	0.2%	4.2%	N	N
17	18.2%	14.5%	79.7%	0.3%	0.3%	100.0%	N	Y
18	32.8%	14.3%	43.5%	10.2%	2.1%	20.7%	N	N
19	43.4%	21.8%	50.3%	12.0%	0.5%	4.4%	N	N
20	52.1%	25.4%	48.6%	20.9%	8.2%	39.4%	Y	Y
22	76.3%	35.0%	45.8%	27.7%	7.7%	27.7%	Y	Y
23	48.6%	33.3%	68.5%	6.4%	5.1%	79.7%	Y	Y

Table 11: Annual Probable Sunlight Hours To Neighbouring Building

4.2.1 Comment on Annual Probable Sunlight Hours

There will be a reduction in sunlight to some of the windows at No.5 Sussex Street and No.11 - 12 Eblana Avenue. Currently there is a single storey building facing the existing windows and they have a largely unobstructed access to sunlight. The construction of any development to the south of these houses no matter how modest in height would result in a reduction in sunlight availability similar to that of the current proposal.

3.6 Former Nurses Home, Eblana Avenue

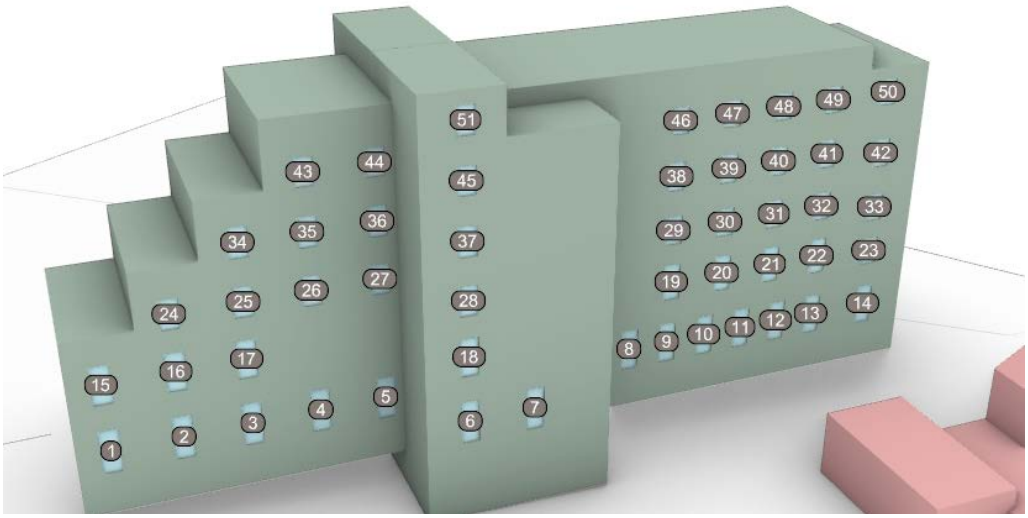


Figure 8: Former Nurses Home, Eblana Avenue - View of model locating APSH test points

Annual Probable Sunlight Hours								
	APSH >25% Target			Sept 21 - Mar 21 WPSH >5% Target			Meets criteria of >25% APSH and >5% WPSH Or <25% or <5% WPSH but retains >80% existing value	
Location ID	Existing	Proposed	Ratio	Existing	Proposed	Ratio		
	% of APSH	% of APSH	If less than 25% APSH Target >80%	% WPSH	% WPSH	If less than 5% WPSH Target >80%	APSH	WPSH
1	63.3%	42.3%	66.9%	22.0%	19.1%	86.7%	Y	Y
2	63.1%	37.7%	59.8%	22.2%	16.3%	73.6%	Y	Y
3	61.8%	32.0%	51.8%	21.7%	13.2%	60.6%	Y	Y
4	59.4%	31.0%	52.2%	21.6%	10.7%	49.4%	Y	Y
5	47.7%	23.5%	49.2%	21.3%	8.4%	39.6%	N	Y
6	61.1%	25.0%	40.9%	21.6%	4.8%	22.3%	Y	N
7	61.0%	29.0%	47.4%	21.5%	3.6%	16.6%	Y	N
8	37.0%	24.3%	65.6%	10.3%	1.4%	14.0%	N	N
9	46.3%	30.1%	64.9%	14.6%	1.9%	13.0%	Y	N
10	47.7%	31.8%	66.7%	16.0%	2.7%	16.7%	Y	N
11	52.5%	35.8%	68.2%	17.2%	3.1%	18.1%	Y	N
12	54.4%	37.5%	69.0%	18.4%	4.5%	24.3%	Y	N
13	54.6%	38.8%	71.1%	18.5%	5.5%	29.6%	Y	Y
14	55.5%	42.5%	76.6%	19.2%	8.0%	41.5%	Y	Y
15	66.1%	45.0%	68.1%	23.4%	19.5%	83.3%	Y	Y
16	66.3%	39.9%	60.1%	23.6%	16.3%	69.2%	Y	Y
17	65.5%	36.5%	55.8%	23.6%	13.2%	55.6%	Y	Y
18	65.1%	33.3%	51.1%	23.1%	5.0%	21.5%	Y	N
19	50.2%	34.4%	68.6%	16.1%	3.8%	23.4%	Y	N
20	55.2%	39.7%	71.8%	18.2%	5.3%	29.2%	Y	Y
21	59.3%	43.3%	73.0%	20.3%	7.0%	34.4%	Y	Y
22	59.2%	44.8%	75.7%	20.3%	8.3%	41.1%	Y	Y
23	60.7%	48.5%	79.9%	21.6%	11.5%	53.1%	Y	Y
24	67.1%	42.2%	63.0%	24.0%	16.3%	68.0%	Y	Y
25	66.1%	41.2%	62.4%	24.0%	13.1%	54.3%	Y	Y
26	62.8%	39.3%	62.6%	24.0%	10.9%	45.2%	Y	Y
27	49.9%	30.7%	61.5%	23.1%	8.8%	38.0%	Y	Y
28	66.9%	38.7%	57.8%	24.0%	5.4%	22.5%	Y	Y
29	53.8%	40.1%	74.5%	16.9%	5.6%	33.3%	Y	Y
30	58.8%	45.1%	76.7%	18.9%	7.5%	39.8%	Y	Y
31	62.3%	49.3%	79.1%	20.5%	9.7%	47.2%	Y	Y

Annual Probable Sunlight Hours								
	APSH >25% Target			Sept 21 - Mar 21 WPSH >5% Target			Meets criteria of >25% APSH and >5% WPSH Or <25% or <5% WPSH but retains >80% existing value	
Location ID	Existing	Proposed	Ratio	Existing	Proposed	Ratio		
	% of APSH	% of APSH	If less than 25% APSH Target >80%	% WPSH	% WPSH	If less than 5% WPSH Target >80%	APSH	WPSH
32	62.9%	51.3%	81.5%	21.0%	11.3%	53.9%	Y	Y
33	64.2%	54.3%	84.6%	22.5%	14.3%	63.6%	Y	Y
34	66.3%	46.6%	70.3%	24.0%	13.1%	54.4%	Y	Y
35	62.8%	44.1%	70.2%	24.0%	11.2%	46.4%	Y	Y
36	49.9%	33.9%	67.9%	23.1%	10.0%	43.2%	Y	Y
37	67.1%	43.7%	65.1%	24.0%	6.8%	28.1%	Y	Y
38	56.8%	46.7%	82.2%	16.9%	8.5%	50.3%	Y	Y
39	61.8%	51.7%	83.7%	19.6%	11.2%	57.2%	Y	Y
40	64.2%	54.8%	85.5%	21.6%	13.8%	64.1%	Y	Y
41	64.7%	57.5%	88.8%	22.0%	16.0%	72.7%	Y	Y
42	65.8%	60.2%	91.4%	23.0%	18.3%	79.5%	Y	Y
43	62.8%	49.1%	78.2%	24.0%	13.2%	54.9%	Y	Y
44	49.9%	38.0%	76.1%	23.1%	13.2%	57.1%	Y	Y
45	67.1%	50.3%	74.9%	24.0%	10.8%	45.0%	Y	Y
46	62.6%	57.6%	92.0%	20.3%	16.1%	79.5%	Y	Y
47	65.1%	60.5%	92.9%	22.3%	18.5%	82.9%	Y	Y
48	66.0%	62.0%	93.9%	23.1%	19.8%	85.4%	Y	Y
49	66.7%	63.4%	95.1%	23.7%	20.9%	88.4%	Y	Y
50	67.1%	65.0%	96.8%	24.0%	22.3%	92.7%	Y	Y
51	67.1%	61.2%	91.1%	24.0%	19.1%	79.6%	Y	Y

Table 12: Annual Probable Sunlight Hours To Neighbouring Building

4.3.1 Comment on Annual Probable Sunlight Hours in Former Nurses Home, Eblana Avenue

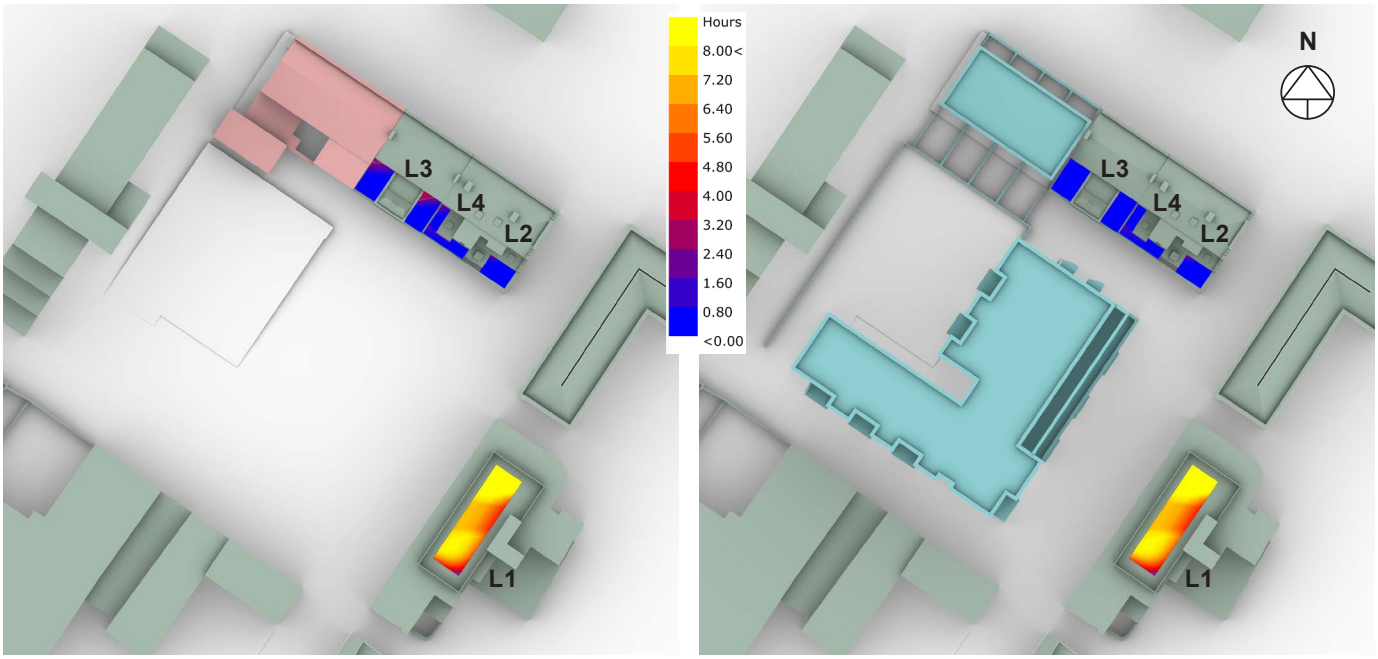
The current use of the facility is not know, however, the previous use would be mostly sleeping accommodation which does not have a strong requirement for direct sunlight and any impact will be minor.

5. Sunlight to Amenity in Neighbouring Properties

The BRE guidelines BR209:2022 (third edition) indicates that for an amenity area to have good quality sunlight throughout the year, 50% of the space should receive in excess of 2 hours sunlight on the 21st March. It also states that front gardens need not be assessed for sunlight. Amenity spaces which are entirely south of the proposed development will not perceive any reduction in sunlight. The amenity space is assessed for the amount of direct sunlight received by the space in 5 minute intervals between 8am and 6pm on the 21st March over an analysis grid with a 300mm grid size and the average is calculated.

5.1 Amenity Space to Neighbouring Properties

The neighbouring amenity spaces were assessed for a potential impact on their sun of the ground. The existing and proposed generated analysis are shown in Figure 9, the results are shown in Table 13 below.



Existing **Proposed**

Figure 9: Existing & Proposed radiation map of amenity areas, showing available sunlight on 21st March. The scale represents the sunlight received from 0 - 8 hours.

Sunlight on the Ground - Neighbouring Properties					
No.		% Area receiving 2 hours sunlight on 21st March		Ratio	Meets criteria of >50% area Or if <50% then target >80% Existing Value
	Location	Existing	Proposed	Proposed: Existing	
L1	1-4 Sussex Street	99.0%	99.0%	100%	Meets Criteria
L2	5 Sussex Street	0%	0%	100%	Meets Criteria
L3	11 Eblana Avenue	0.8%	0%	0%	Meets Criteria
L4	12 Eblana Avenue	0%	0%	100%	Meets Criteria

Table 13: Calculation of Sun on the Ground to Neighbouring Amenity Areas

5.2 Conclusion

The private amenity space to the surrounding properties were assessed for sunlight in accordance with the recommendations set out in BR209:2022. The assessment calculates the available sunlight over the amenity space on the 21st March. Locations L1 - L3, No.5 Sussex Street and No.11 - 12 Eblana Avenue receive little to no sunlight on the ground plane on the 21st of March in the existing condition. There will be no reduction in available sunlight on the 21st March. The amenity spaces to 1-4 Sussex Street will retain 2 hours sunlight over 50% of the area or will not be reduced below 80% of the existing levels. The proposed development meets the recommendations for sunlight in the BRE guidelines BR209:2022 (third edition).

6. Daylight within the Proposed Development

All habitable rooms within the units were assessed for daylight provision by illuminance method. The Illuminance method assesses the daylight levels over at least 50% daylight hours in the year and uses a weather file data set. These methods take into account the orientation of the space. They provide an accurate representation of the daylight provision to a specific room in the context of the proposed environment.

Compliance is demonstrated by a calculation of Daylight Provision with the illuminance method under BS EN 17037:2018+A1:2021. A summary of the results are presented in Table 13 below and a complete set of room results are shown in Appendix A.

For supplementary information, an assessment of Daylight Provision with the illuminance method under IS /BS EN 17037:2018 is undertaken. A summary of the results are presented in Table 14 below and a complete set of room results are shown in Appendix B.

6.1 Assessment for Daylight Provision BS EN 17037:2018+A1:2021

The UK National Annex (A1) contains minimum room specific target values for dwellings in the UK. Ireland has a similar latitude and climate to the UK. The minimum illuminance levels are kitchens and living spaces containing a kitchen 200lux, living rooms 150lux and bedrooms 100lux. It is recommended that these target illuminance values are exceeded over at least 50% of the points on a reference plane 0.85m above the floor, for at least half of the daylight hours.

The UK committee supports the recommendations of EN17037:2018 but considers the target daylight levels may be hard to achieve in UK dwellings, in particular in urban areas and areas with mature trees. The Target and Minimum levels set out in IS / BS EN17037:2018 does not take into account room use or make allowance for room that have a lesser requirement for daylight.

Minimum daylight provision UK NA.1 - BS EN 17037:2018+A1:2021					
	Room Use	Number of rooms	Target illuminance E_T(lx) for half of the assessment grid	Number of rooms to achieve target Lux over 50% of the assessment grid	Percentage of rooms achieving Target
Apartments	LKD	55	200	55	100%
	Bedrooms	71	100	71	100%
Total		126		121	100%

Table 14: Summary of room for Target Illuminance compliance with BS EN 17037:2018+A1:2021. Individual room results can be viewed in Appendix A.

6.2 Conclusion

BR209:2022 recommends assessment methods set out in BS EN 17037 for daylight provision. 100%% of the Living, Dining, Kitchen and Bedroom spaces to the apartments achieve the target values set out in BS EN 17037:2018+A1:2021 section NA1. These are the minimum values, per specified use, to be achieved in habitable rooms.

6.3 Supplementary Information - Assessment for Daylight Provision IS / BS EN 17037:2018

A summary of Minimum and Target Illuminance levels under IS EN 17037:2018 Annex A Table A1 are set out in the table below.

Daylight provision Illuminance Method IS EN 17037:2018						
		Below Target	Minimum	Medium	High	Percentage of rooms achieving Target
Apartments	Target Illuminance	22.2%	26.2%	27.8%	23.8%	77.8%
	Minimum Illuminance	13.5%	37.3%	29.4%	19.8%	86.5%

Table 15: Percentage of rooms at each level to IS/BS EN 17037:2018. Individual room results can be viewed in Appendix B.

The results indicate a high level of daylight provision, with 85.7% of rooms achieving Minimum Illuminance and 77.8% achieving Target Illuminance. The rooms will be bright and pleasant spaces.

The recommendations for Daylight provision in Table A1 are not specific for dwellings and do not make allowance for room use. BS EN 17037:2018+A1:2021 address this with the National Annex NA.1 which sets out room specific targets for dwellings and compliance for this is presented in Section 6.2.

7. Sunlight within the Proposed Development

7.1 Sunlight Hours

BR209:2022 (third edition) and BS EN 17037 set out recommendations for sunlight hours to be achieved preferably in a main living space. The guidelines recommends the sunlight hours should be assessed preferably on the 21st March over the course of the day. The guidelines sets three levels of achievement. Minimum 1.5h, Medium 3h and High 4h. The guideline does not set the percentage of units that need the achieve the recommendations but does give an example of a well designed floor layout in figure below where 4 out of 5 units in an apartment building would achieve the target sunlight.

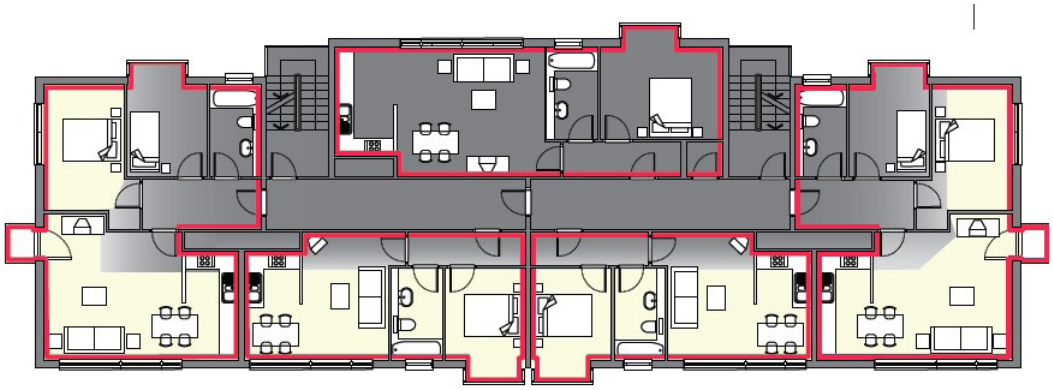


Figure 10: Extract from BR209:2022 Section 3 Sun-lighting: Diagram indicating sample floor plan to maximise units with a main living space facing south.

The apartments are assessed for sunlight, in accordance with BS EN 17037:2018+A1:2021. Preference is given to living spaces, however the recommendations of the BRE guidelines are met if minimum sunlight hours are achieved in a bedroom. Table 15 details the results per Living/ Kitchen/ Dining room, indicating if this room has a relevant south facing window. A summary of these results are displayed in the Table 14.

Sunlight Hours Summary Table									
	Total Units	Rooms with a window within 90° south		Below recommendation <1.5 hours	Minimum >1.5 hours	Medium >3 Hours	High >4 Hours	Number meets criteria	Ratio meets criteria
		No.	Ratio						
Apartments	55	43	78.2%	9	4	3	39	46	83.6%

Table 16: Summary of Results of Assessment of Sunlight Hours

7.2 Comment on EN 17037 Sunlight Hours

The BRE Guidelines recommend maximising the amount of units that have a window within 90° due south but does not have set targets. The guidelines acknowledge that site constraints may mean its not possible to achieve south facing windows to all main living spaces and that achieving sunlight hours in another habitable room meets the criteria. In this development with 43 no. units 78% have window to a habitable room which faces within 90° south.

Windows with an aspect of greater than 90° due south, to the north west or north east, will still receive sunlight, but it is likely to be lesser amounts especially in the winter period.83% (46no) Units have a habitable room which achieves the minimum recommended 1.5 direct sunlight hours.

7.3 Conclusion

This scheme is well designed for sunlight, with 83% of proposed units meeting the minimum recommended 1.5 direct sunlight hours. This is in line with the BRE guideline example for an apartment layout where 4 in 5 achieves the target sunlight hours.

8. Sunlight to Amenity within the Proposed Development

The BRE guidelines BR209:2022 (third edition) indicate that for an amenity area to have good quality sunlight throughout the year, 50% of the ground, should receive in excess of 2 hours sunlight on the 21st of March. It also states that front gardens need not be assessed for sunlight.

8.1 Sunlight to Amenity within the Proposed Development

The amenity area within this proposal have been assessed with a calculation of Sun on the Ground on the 21st March. Generated analysis is shown in Figure 11 and the results are set out in Table 17 below.

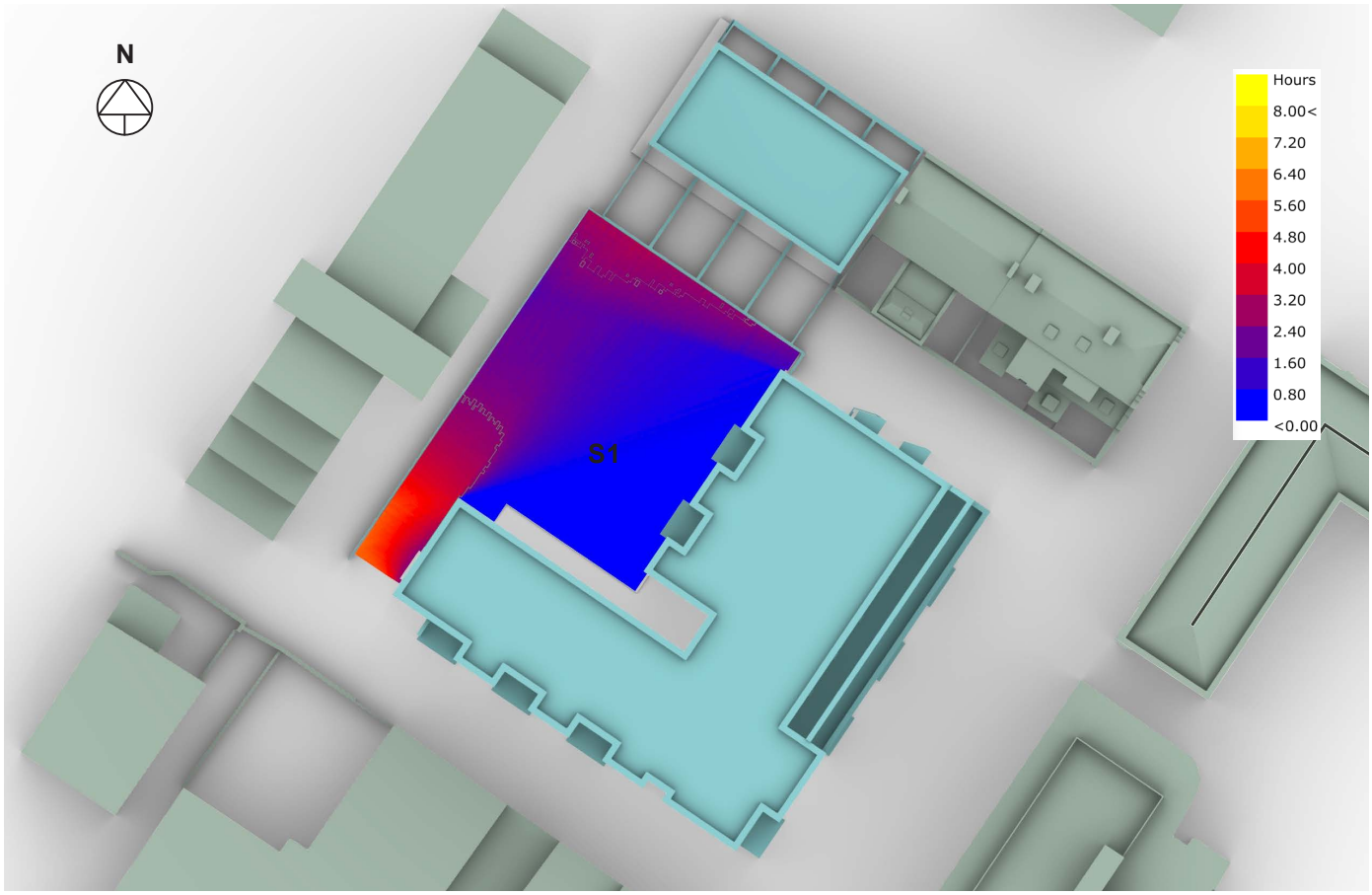


Figure 11: Radiation map of amenity within the proposed development, showing available sunlight on 21st March. The scale represents the sunlight received from 0 - 8 hours.

Sunlight on the Ground - Public & Communal Amenity			
ID No.	Details	% Area receiving 2 hours sunlight on 21st March	Meets criteria if >50% area receiving 2 hours sunlight on 21st March
S1	Communal Open Space	18%	N

Table 17: Calculation of Sun on the Ground to Amenity Areas within the Proposed Development

7.2 Conclusion

The sunlight availability to the amenity space does not achieve the target sunlight hours on the 21st March, however, it will experience greater levels of sunlight from April to August when the sun is higher in the sky and when the amenity space is more likely to be used. The proposed development site is at restricted urban location and the design with many design constraints. The form has developed with priority to protecting existing amenity spaces by locating the block as far away as possible from existing dwellings.

9. Shadow Study

9.1 BRE Guidance on Shadow Studies

The BRE guidelines recommend using the March Equinox due the equal length of the day and night time. It states:

> *"If a space is used all year round, the equinox (21 March) 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 (21 September) will be the same as those for 21 March, so a separate set of plots for September is not required."*

June 21st and December 21st are provided below for information but it should be noted that the summer solstice is the best case scenario with shadows at their shortest. The summer solstice diagrams are included here with the Daylight Saving Time (UTC+1) applied. In Winter even low buildings will cast long shadows, when sun barely rises above an altitude of 10° during the course of the day. It is common for large areas of the ground to be in shadow throughout the day, especially in a built-up area. The guidelines recommend that sunlight at an altitude of 10° or less does not count. Below are the times for the Equinox and Solstice, when the sun is above 10° altitude, rounded to the nearest half hour.

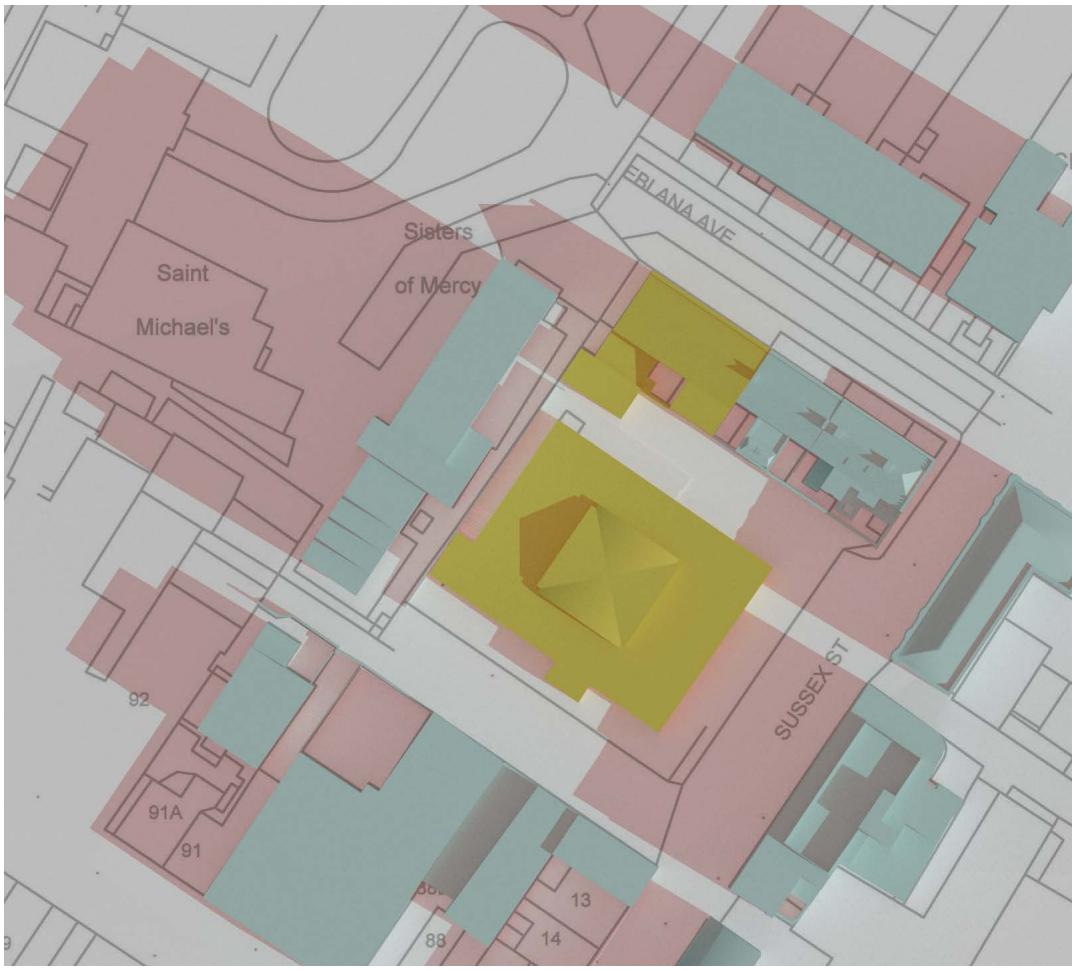
Equinox: between 8:30 and 17:30
Summer Solstice: Between 6:30 and 20:00
Winter Solstice: Between 10:30 and 14:00

Section 9.2 shows the existing and proposed shadow diagrams for the Equinox on the 21st March at 2 hourly intervals during the day between 09:00 and 17:00.
Section 9.3 shows the existing and proposed shadow diagrams for the Summer Solstice on the 21st June at 2 hourly intervals during the day between 09:00 and 19:00.
Section 9.4 shows the existing and proposed shadow diagrams for the Winter Solstice on the 21st December at 2 hourly intervals during the day between 09:00 and 15:00.

Shadow diagrams are a visual aid to understand where possible shading may occur. The use of shadow diagrams as an assessment method should be taken over the course of the day and not a specific time due to the transient nature of the sun and the shade caused by obstructions.

9.2 Shadow Casting diagrams March Equinox

Existing



N

Proposed

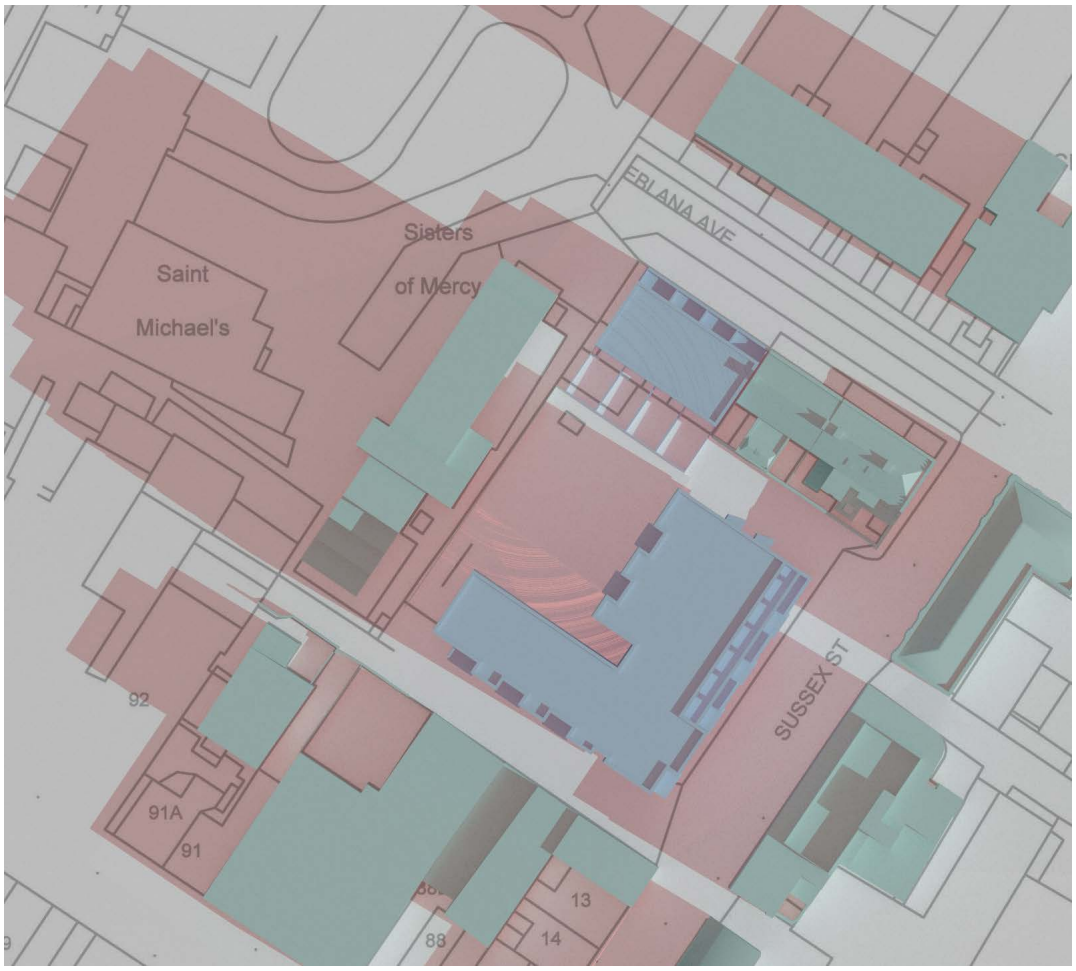
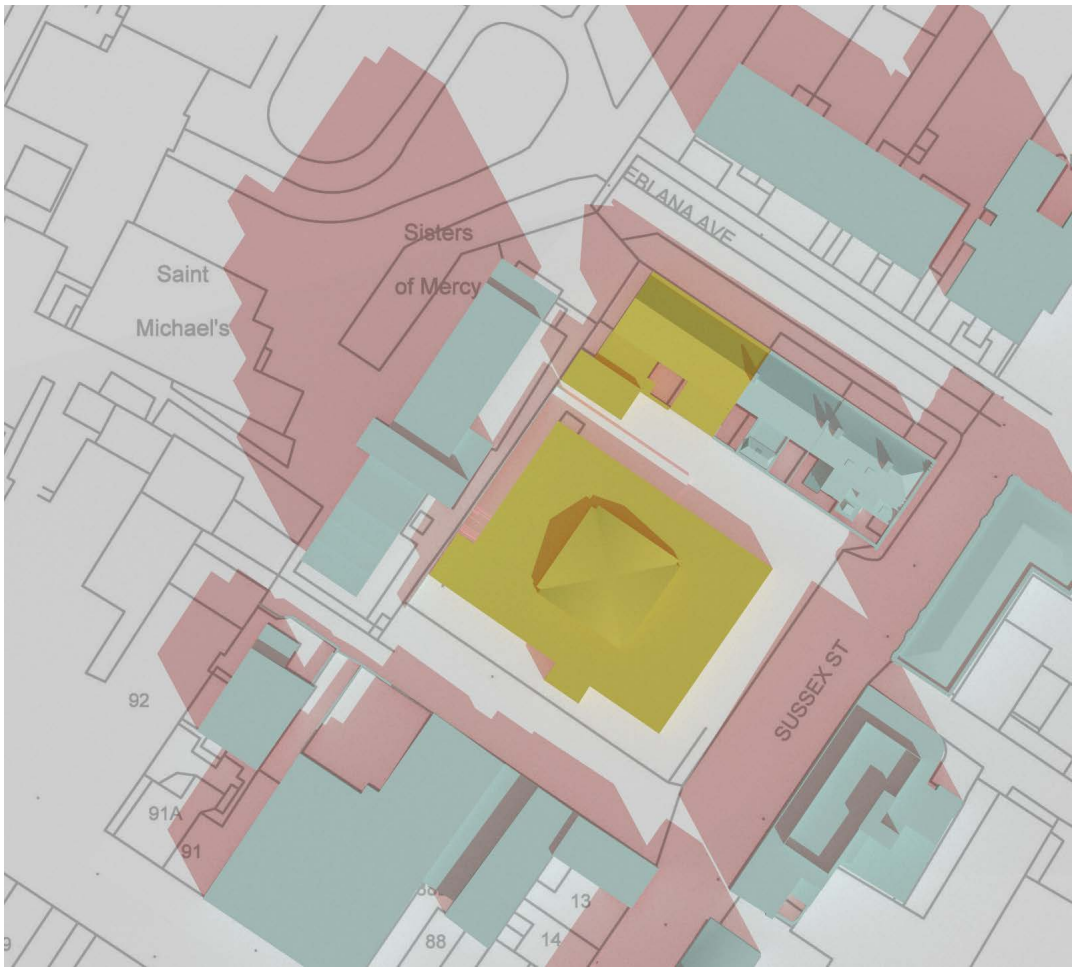


Figure 12: Shadow diagrams 21 March 09:00 UTC

Existing



N

Proposed

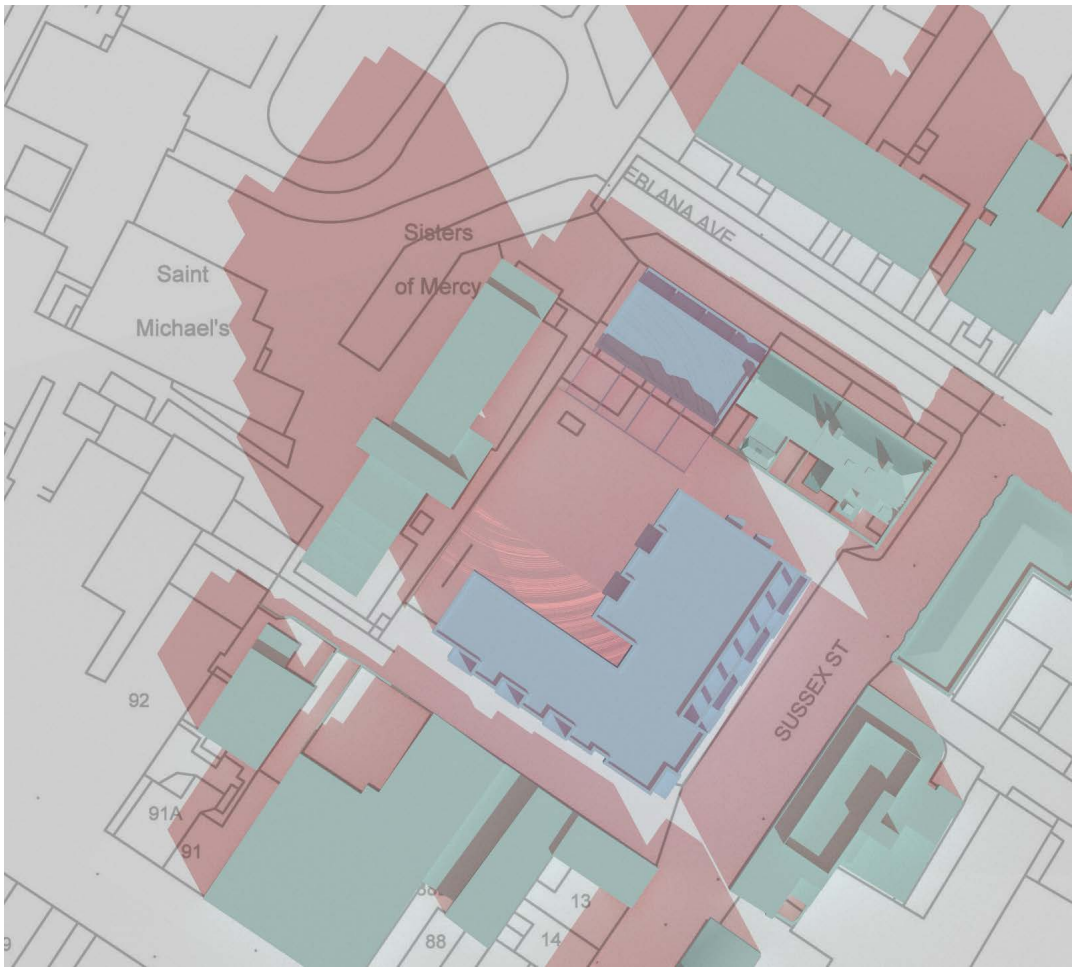
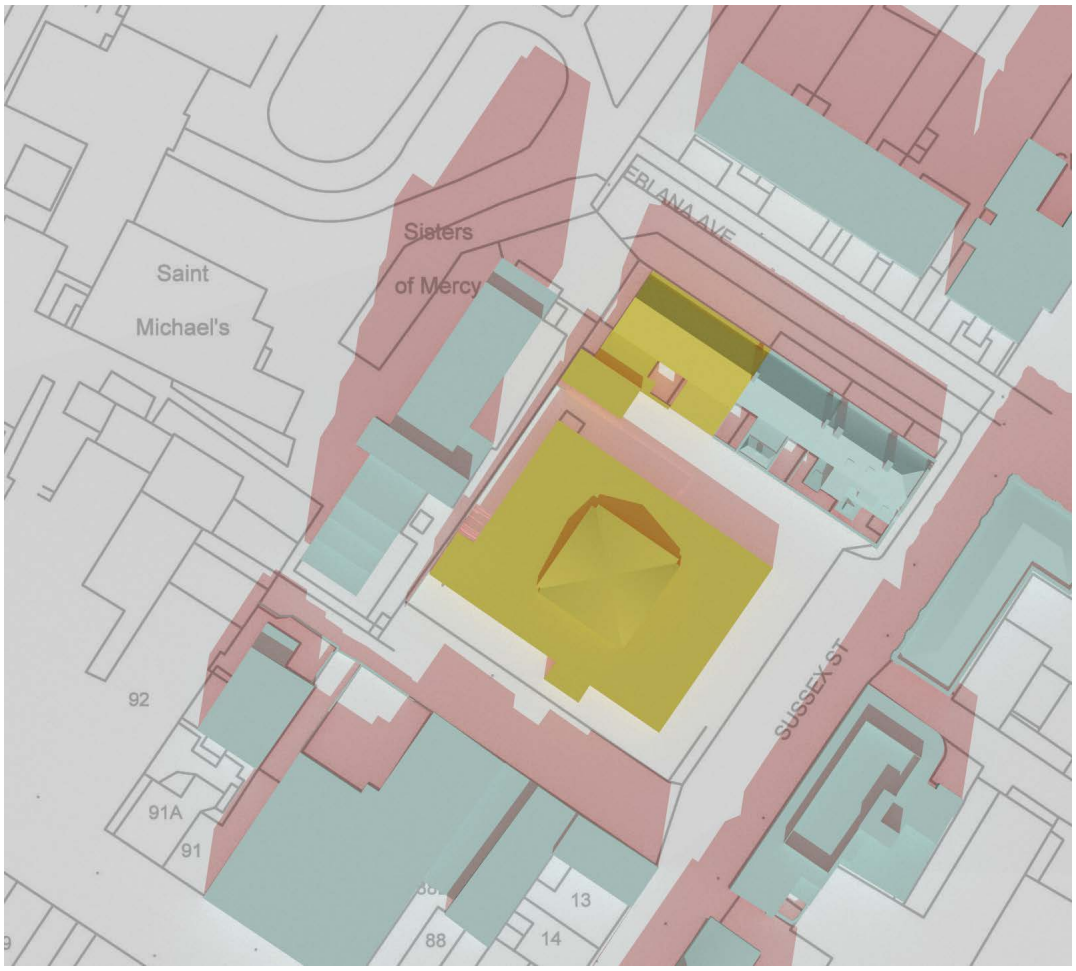


Figure 13: Shadow diagrams 21 March 11:00 UTC

Existing



N

Proposed

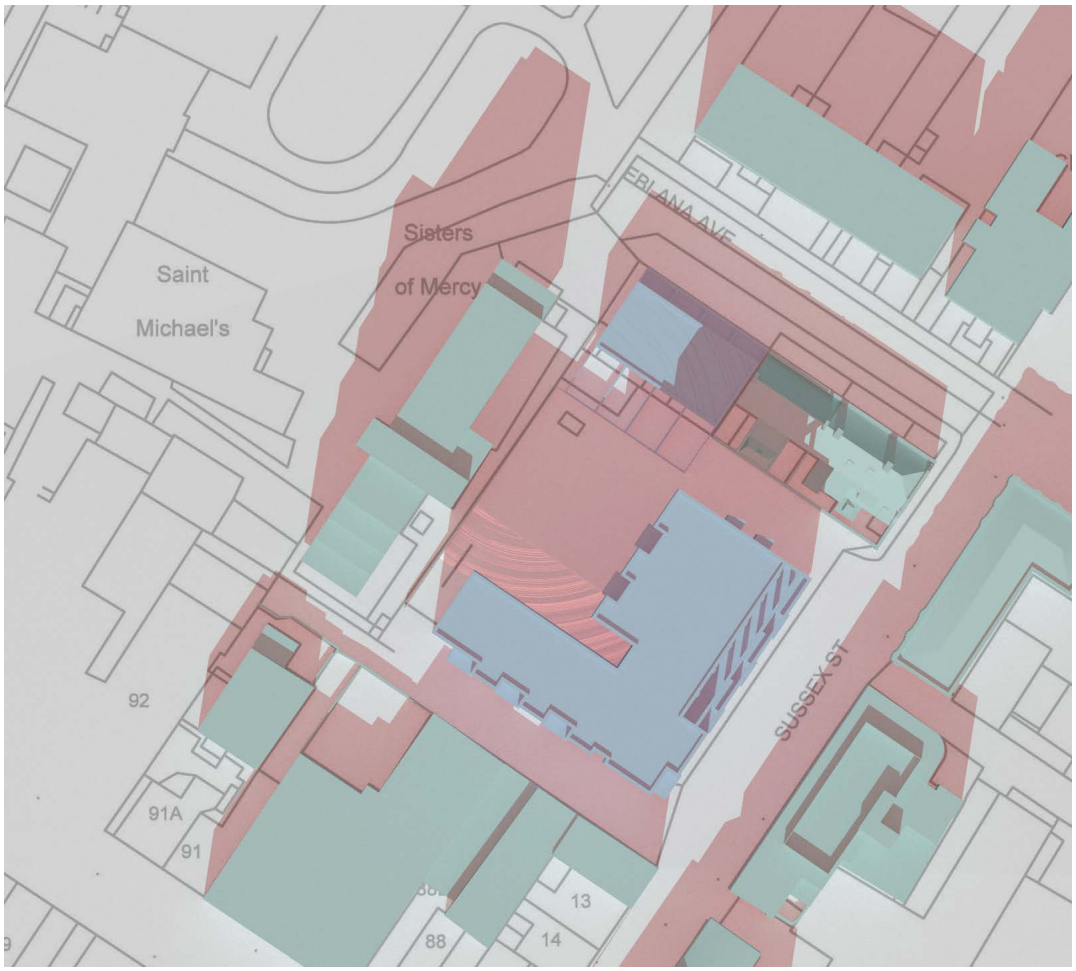
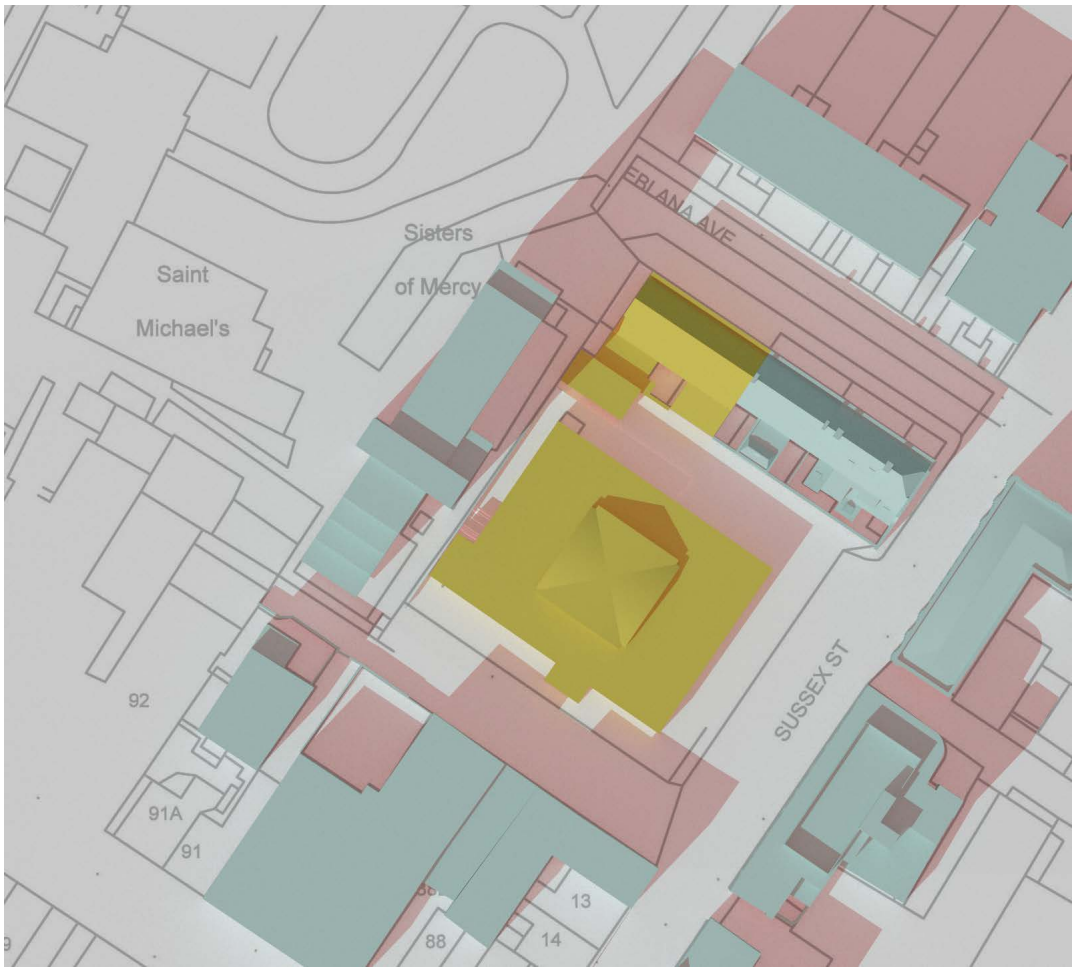


Figure 14: Shadow diagrams 21 March 13:00 UTC

Existing



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Proposed

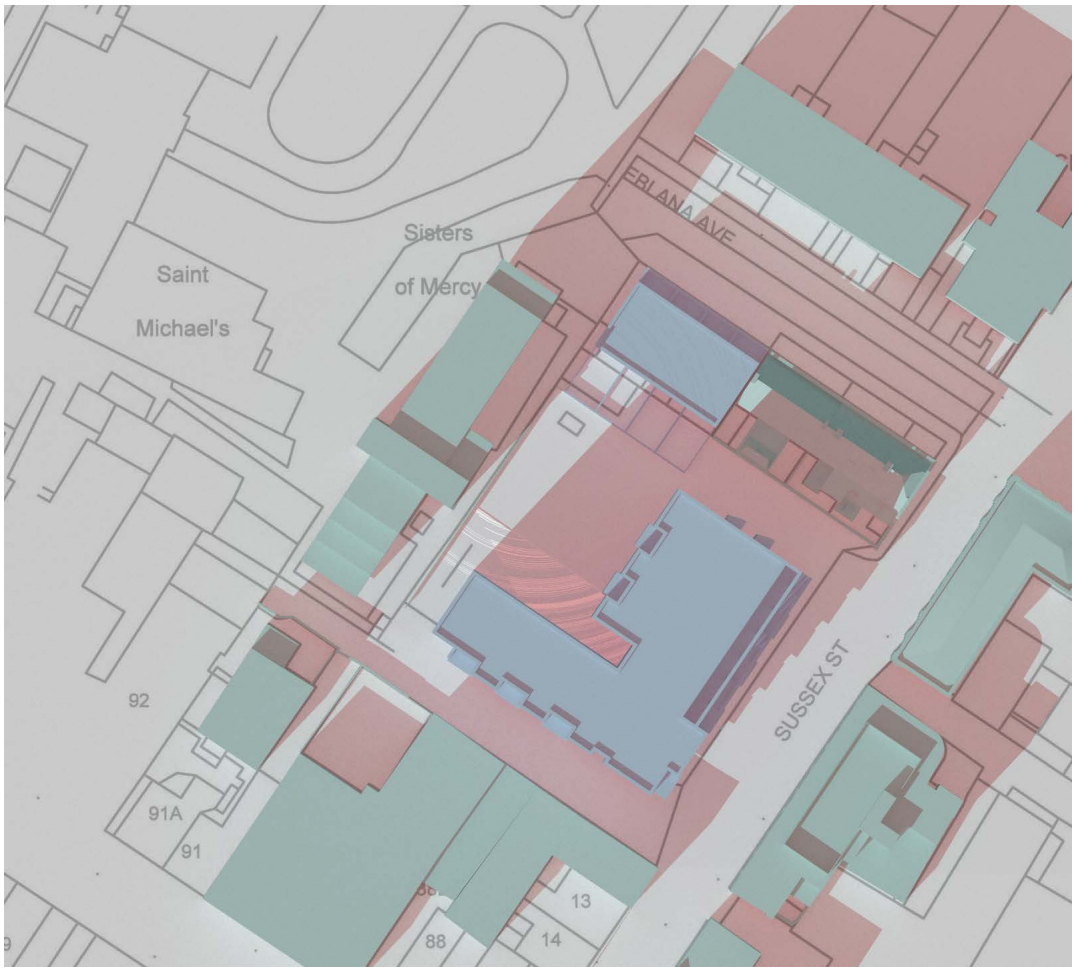
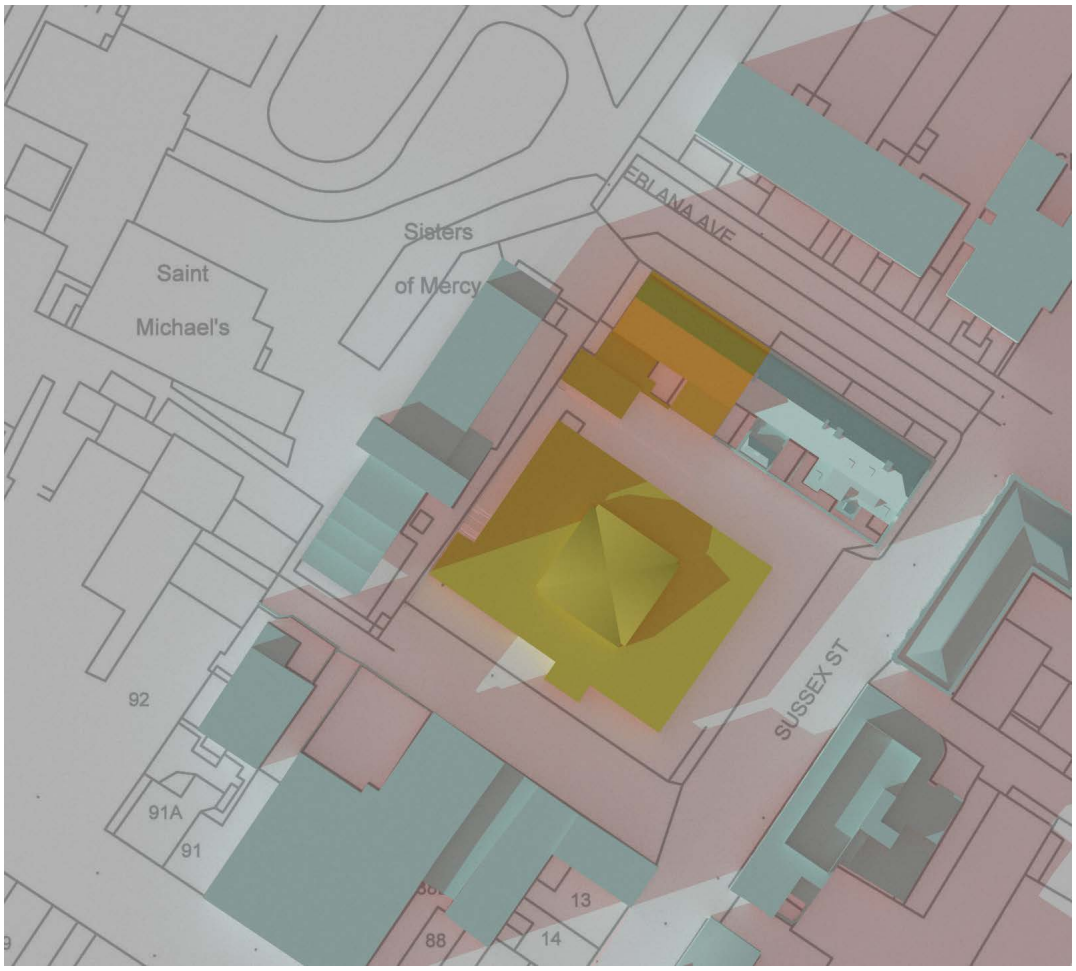


Figure 15: Shadow diagrams 21 March 15:00 UTC

Existing



N

Proposed

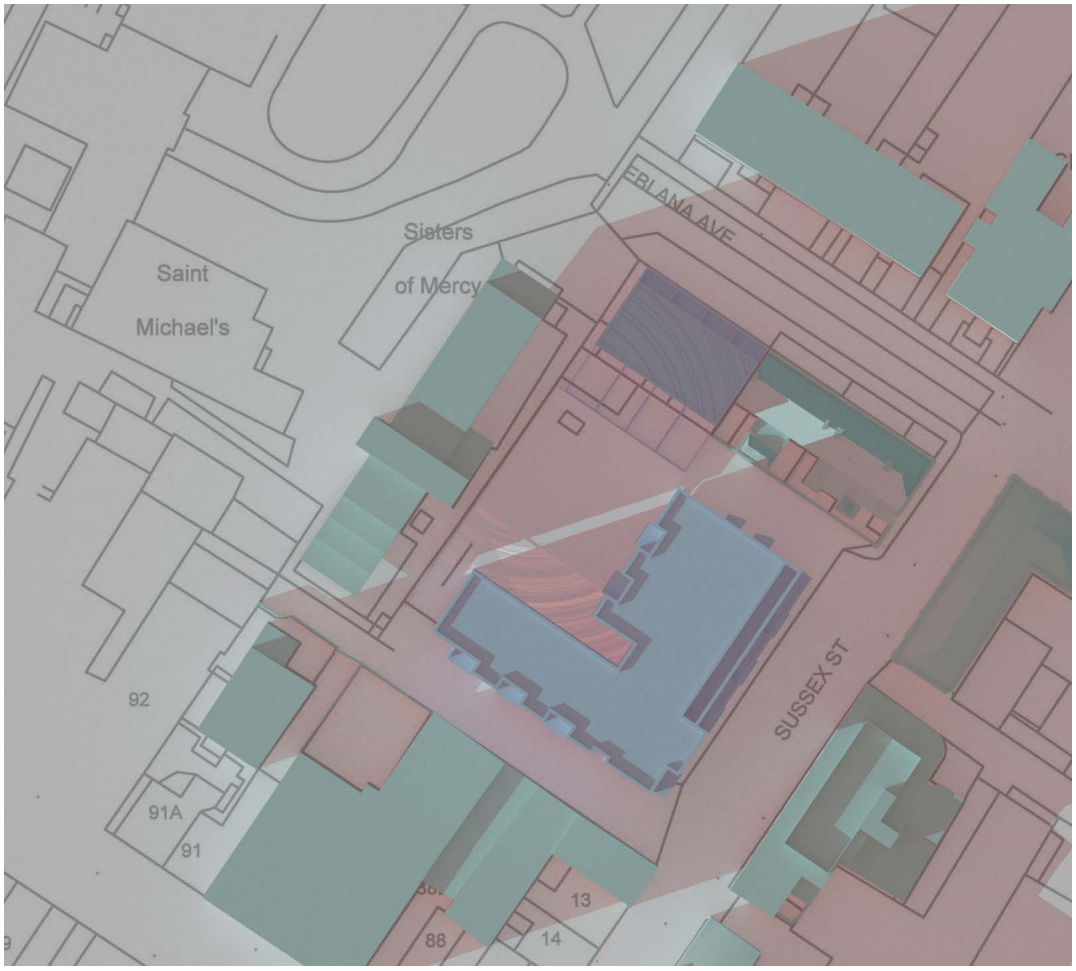


Figure 16: Shadow diagrams 21 March 17:00 UTC

9.3 Shadow Casting diagrams June Solstice

Existing

N

Proposed

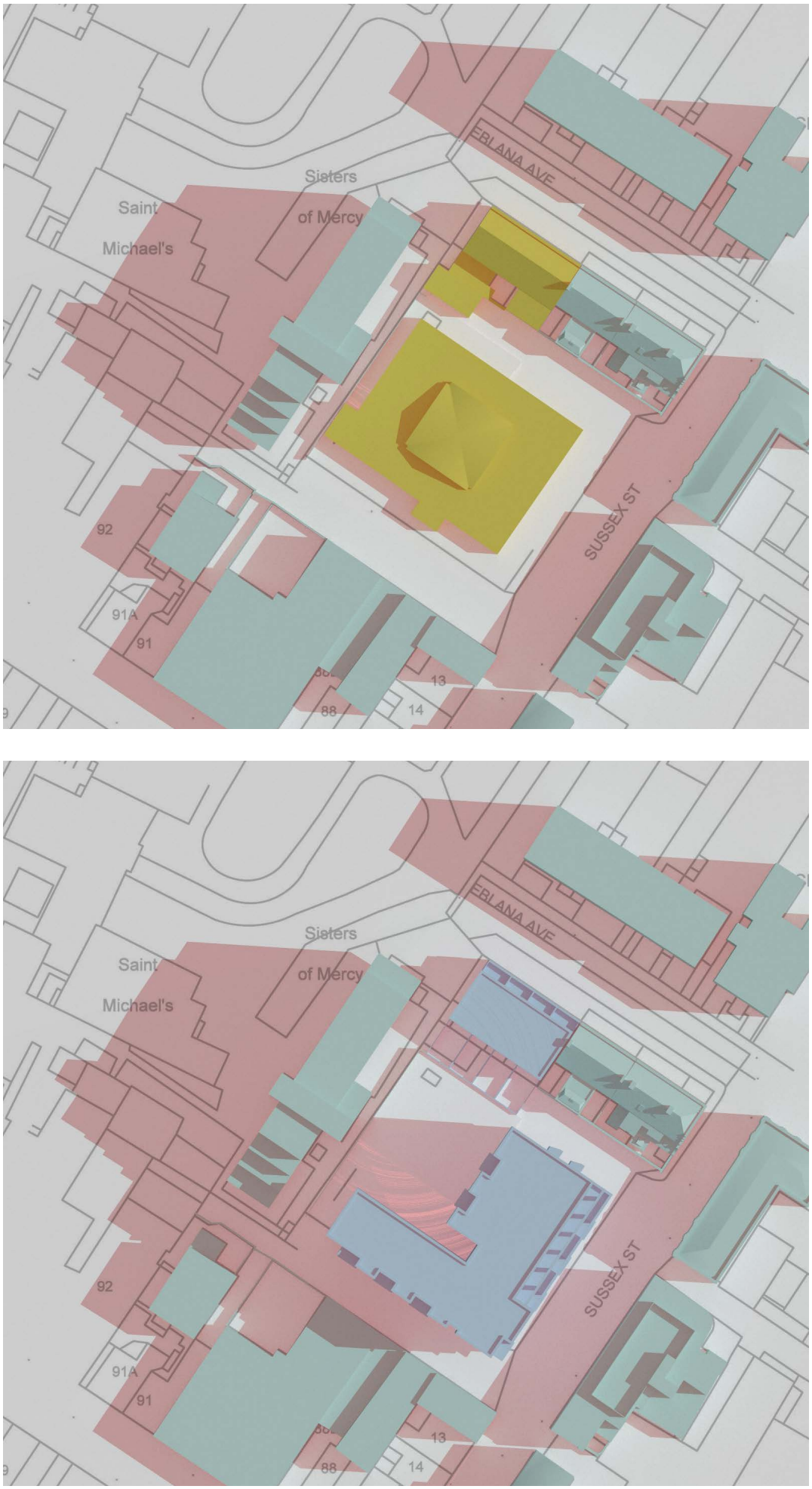
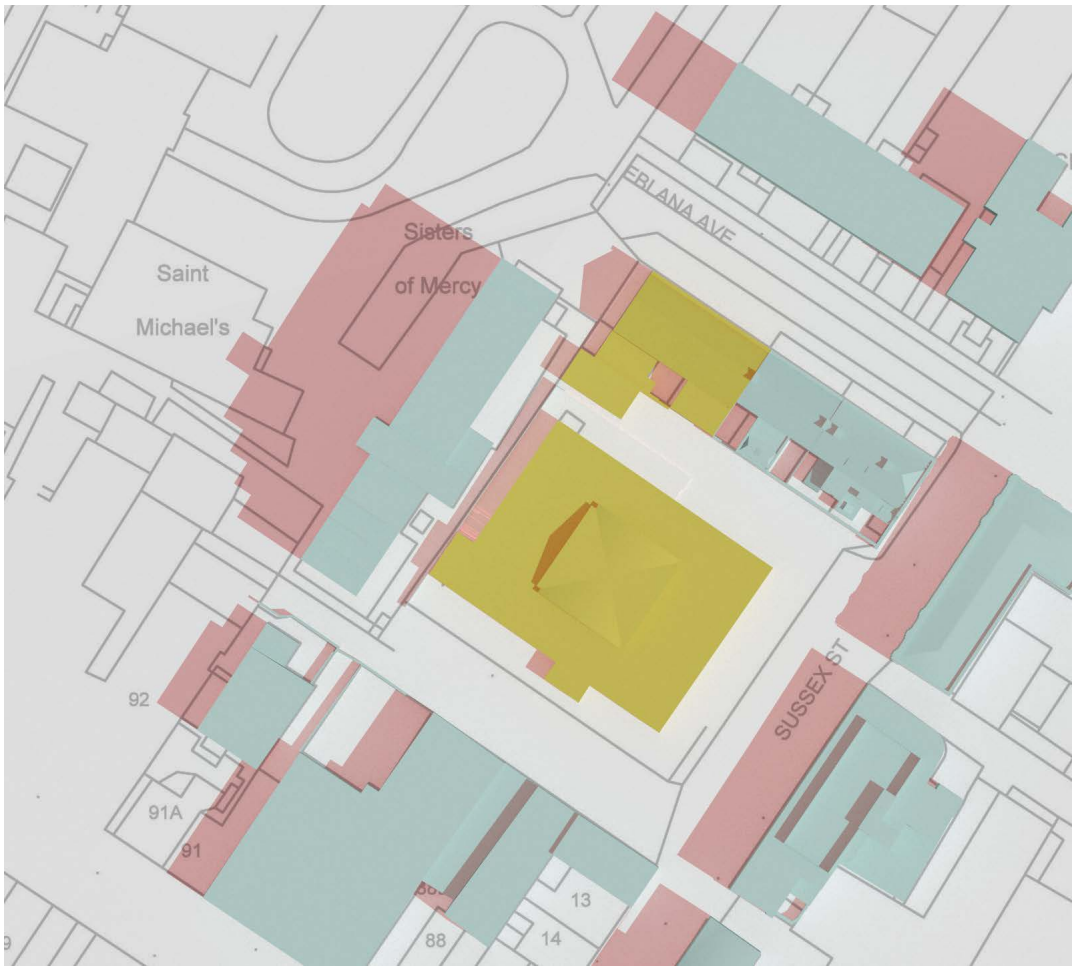


Figure 17: Shadow diagrams 21 June 09.00 UTC +1

Existing



N

Proposed

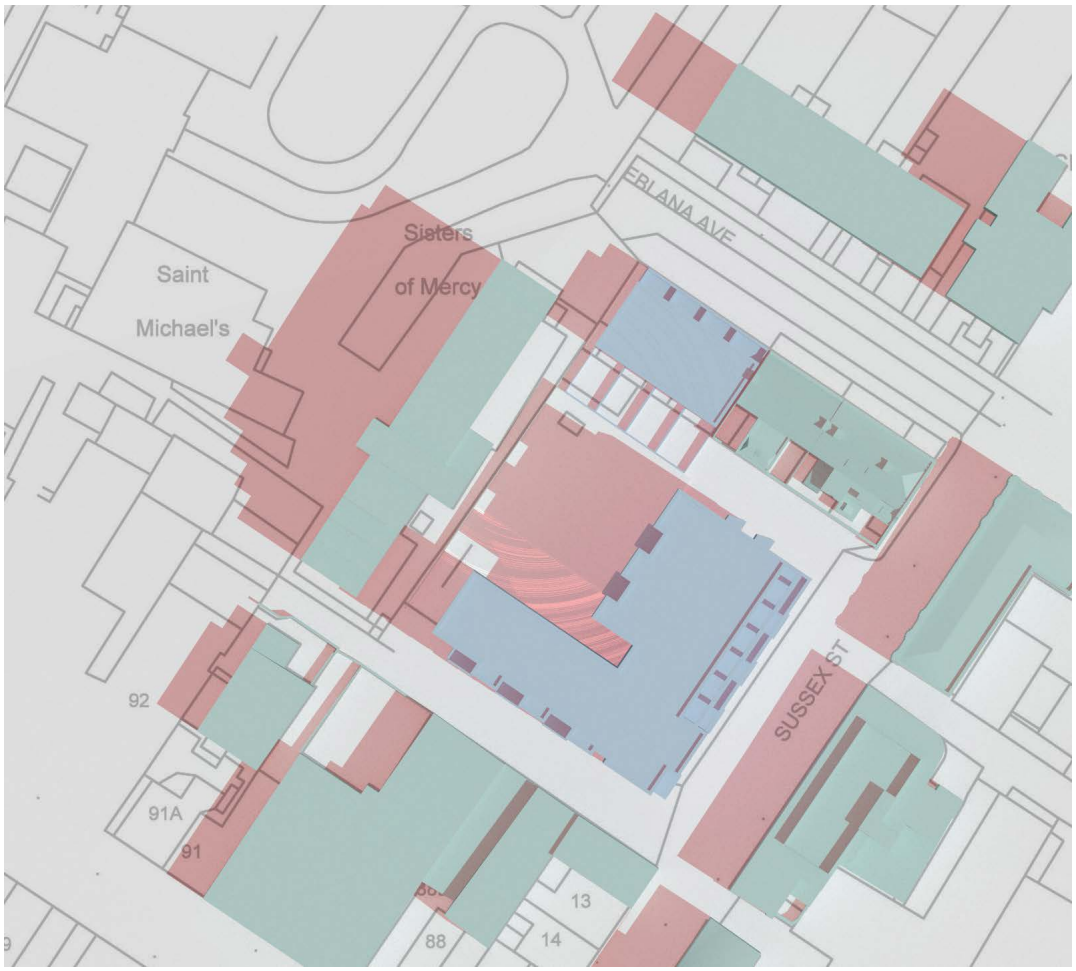
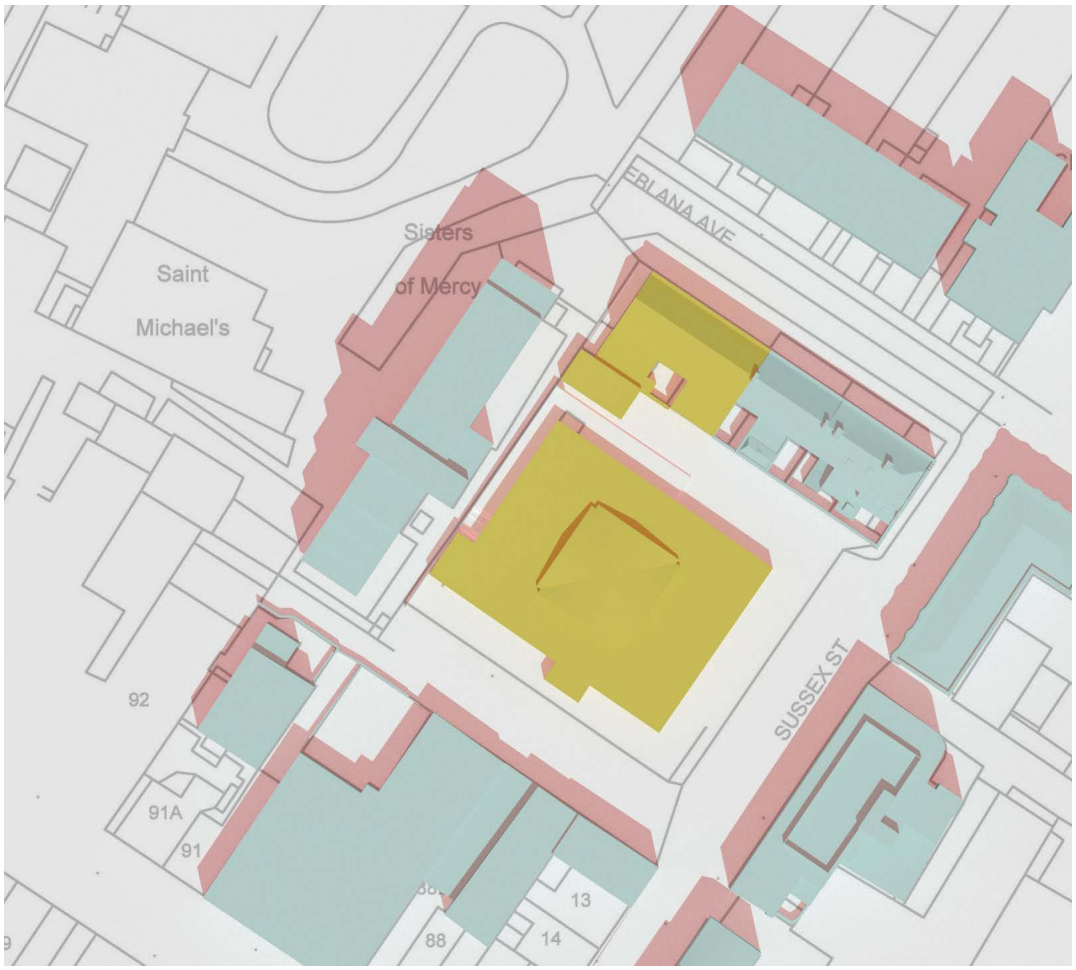


Figure 18: Shadow diagrams 21 June 11:00 UTC +1

Existing

N



Proposed

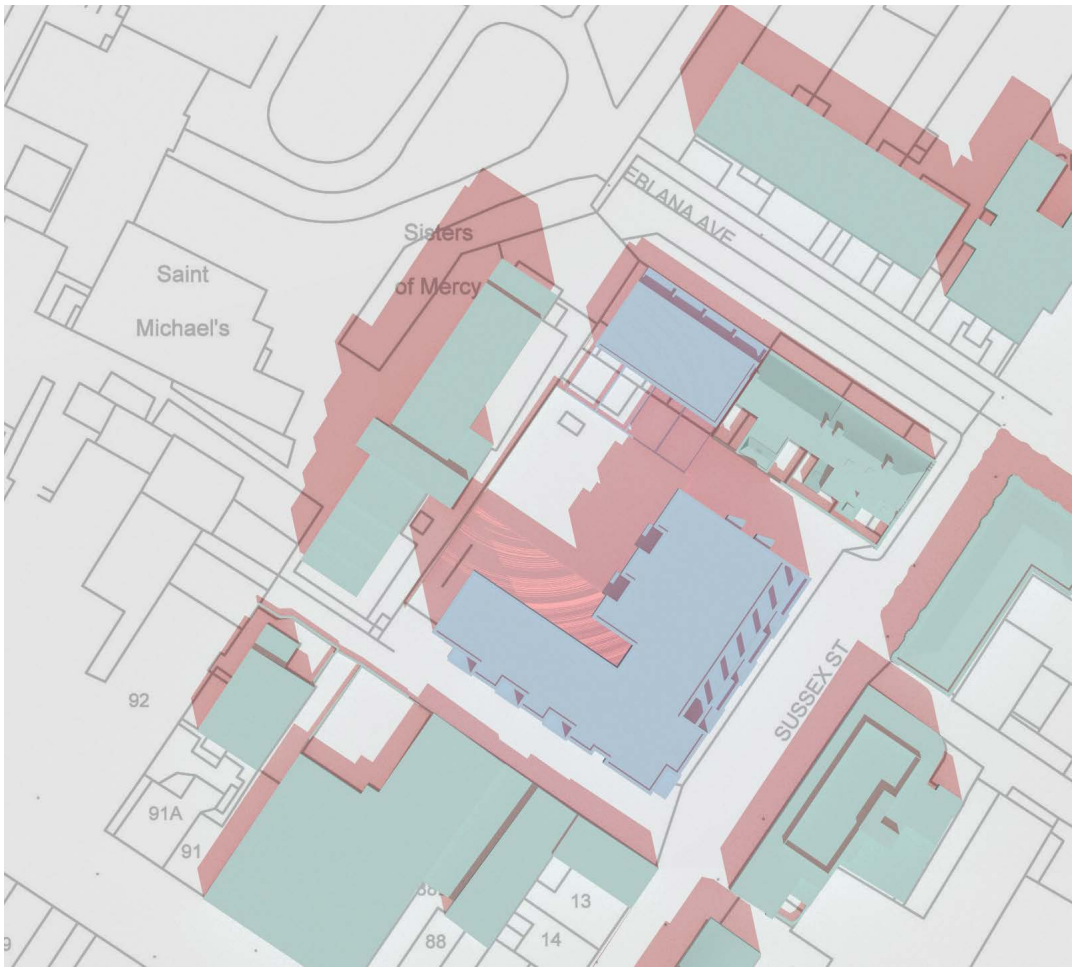
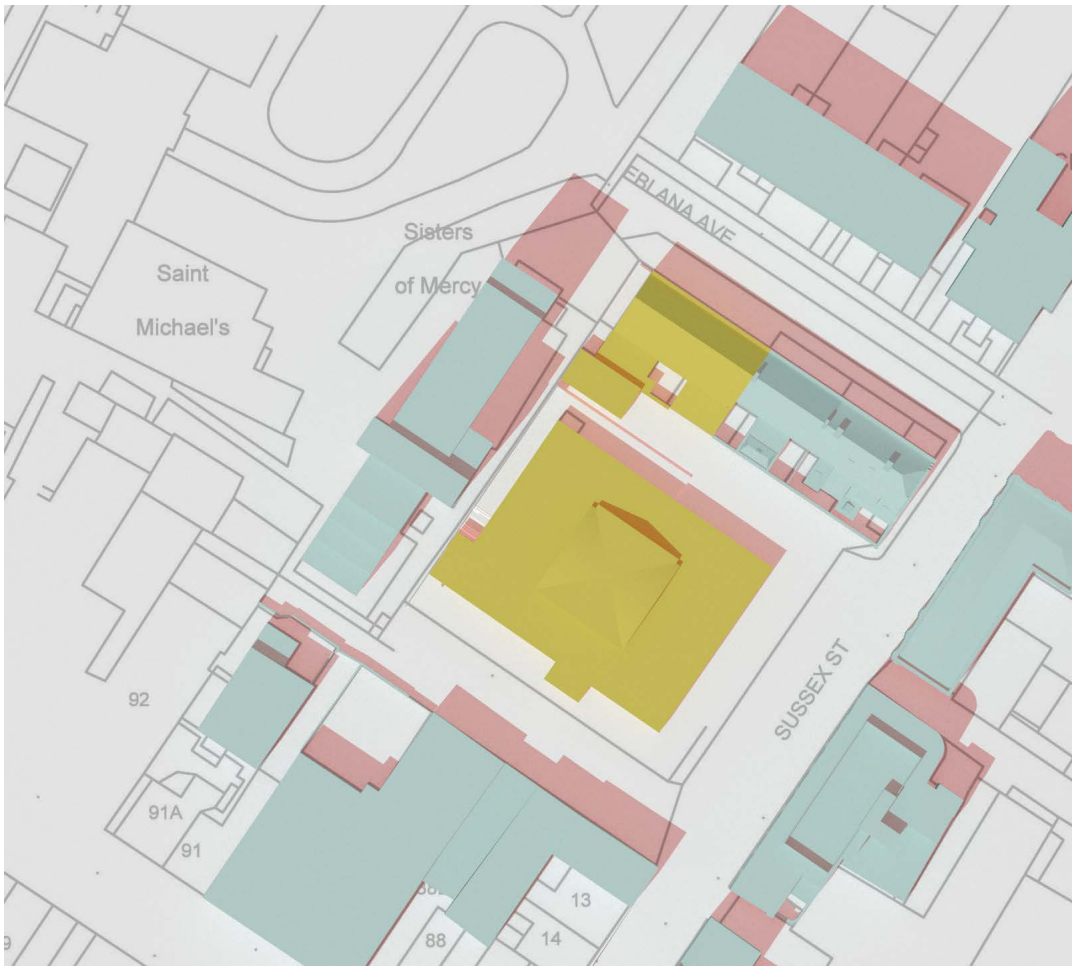


Figure 19: Shadow diagrams 21 June 13:00 UTC +1

Existing



N

Proposed

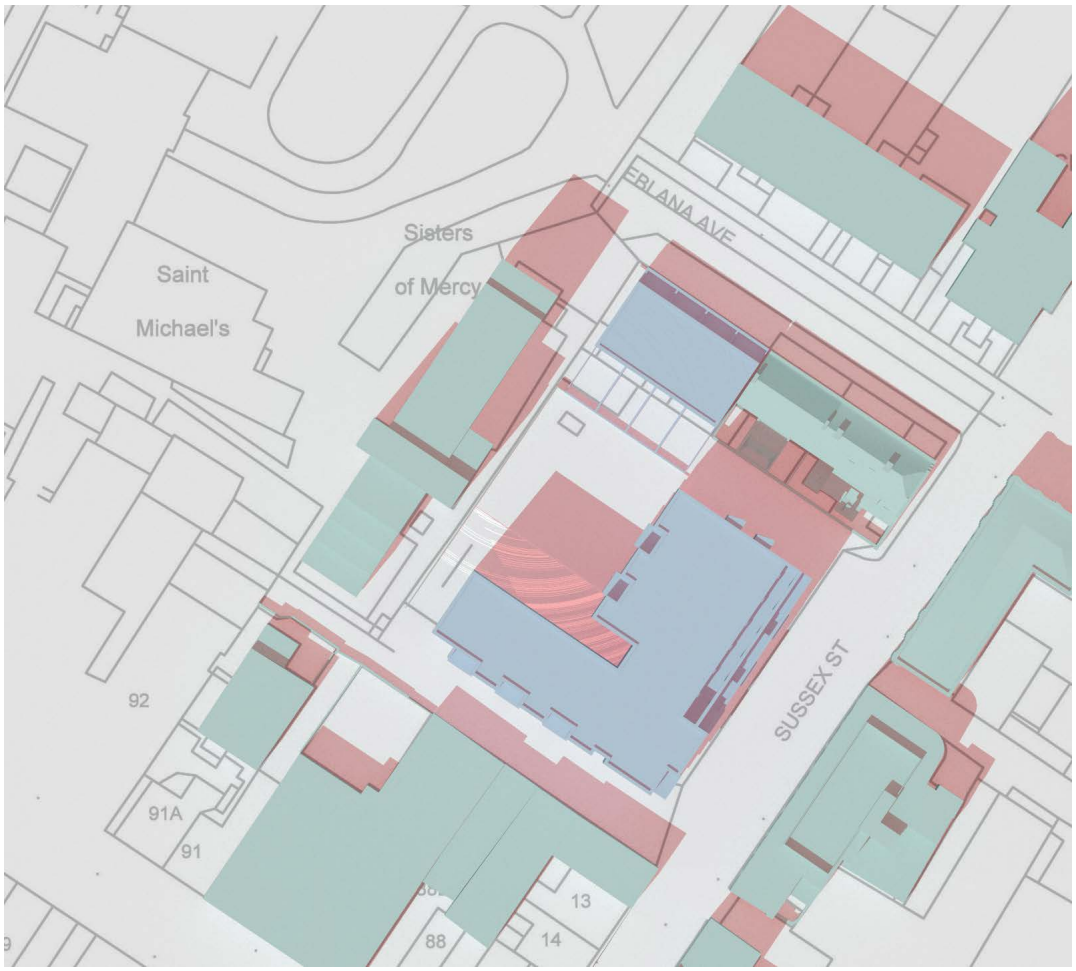
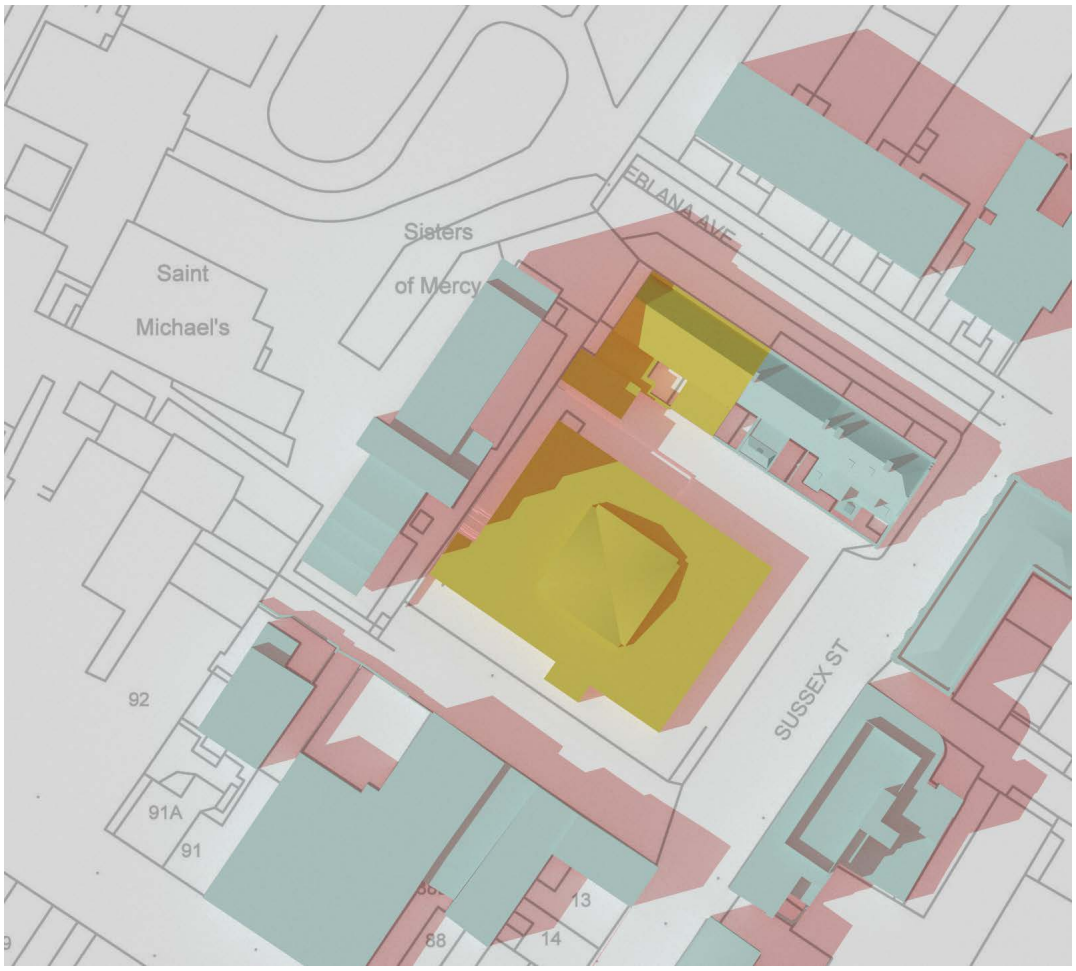


Figure 20: Shadow diagrams 21 June 15:00 UTC +1

Existing



N

Proposed

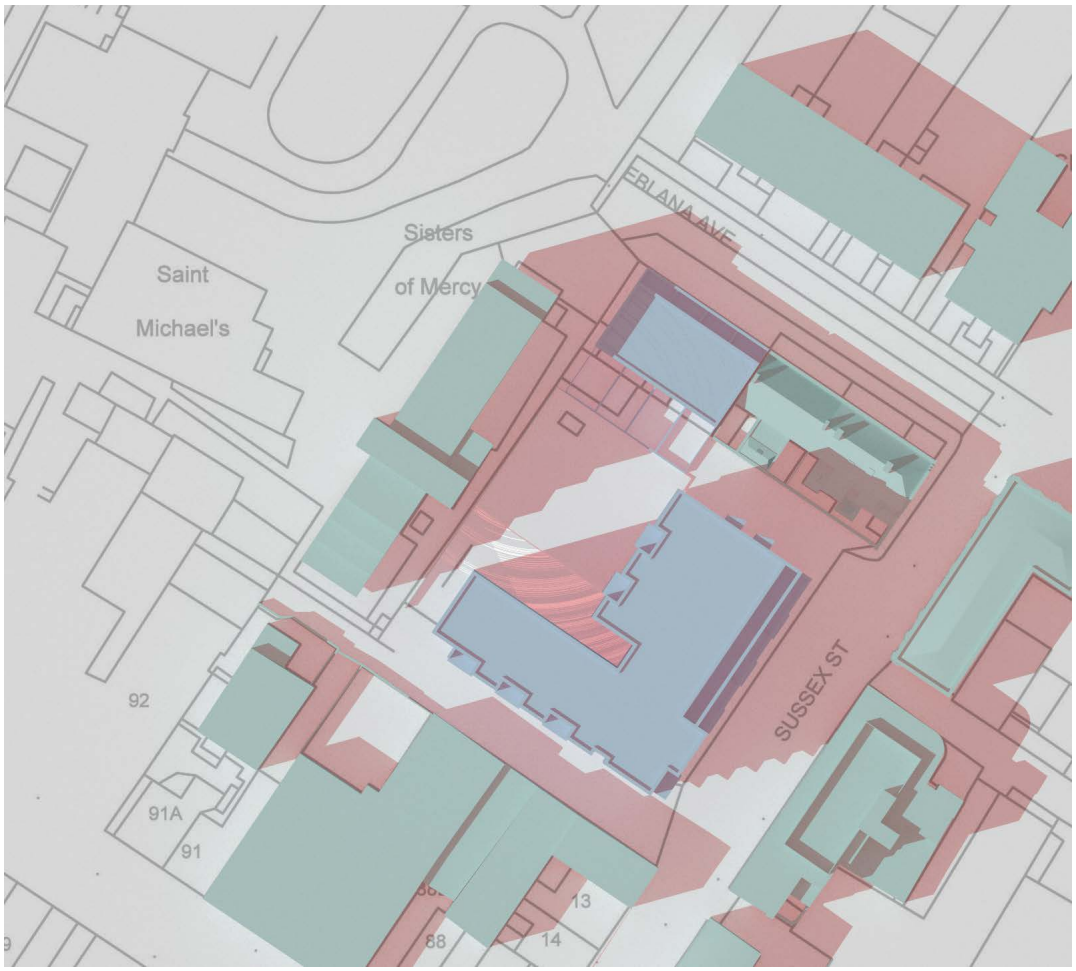
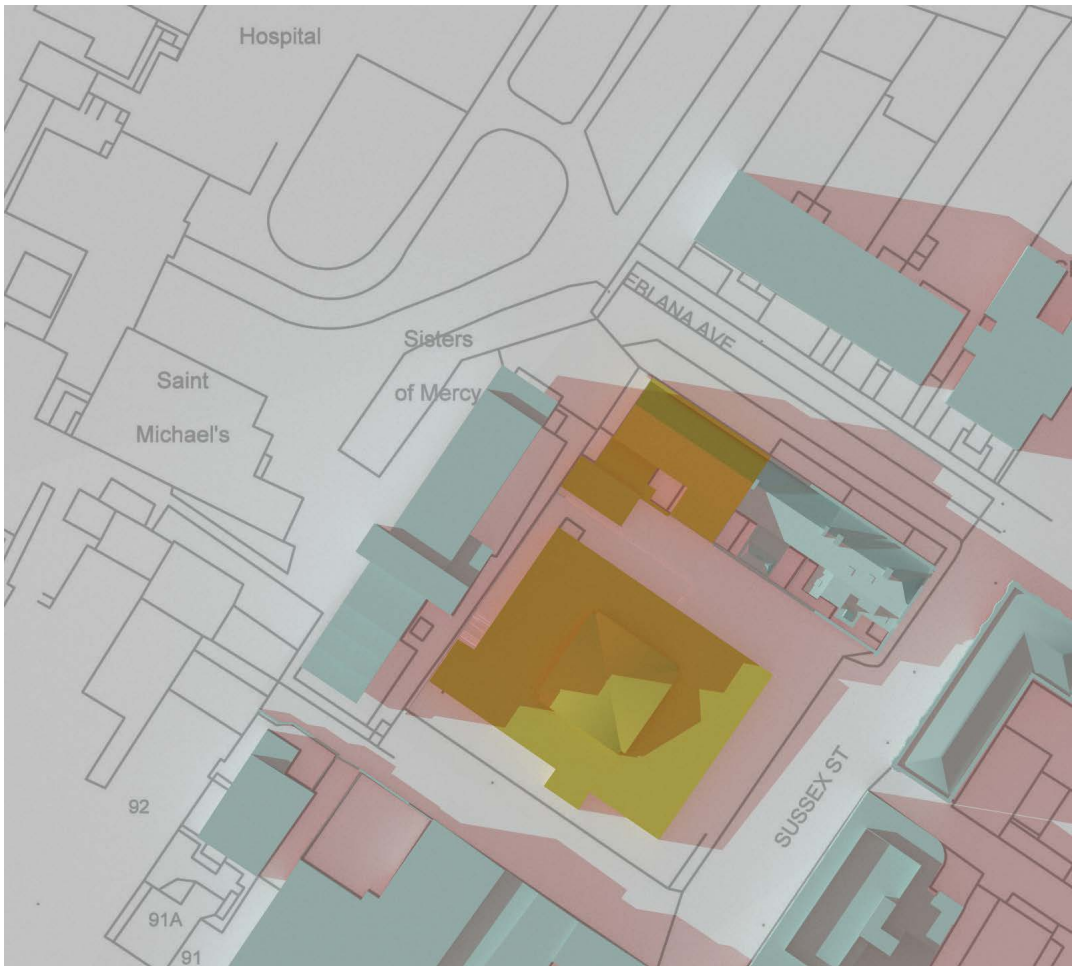


Figure 21: Shadow diagrams 21 June 17:00 UTC +1

Existing



N

Proposed

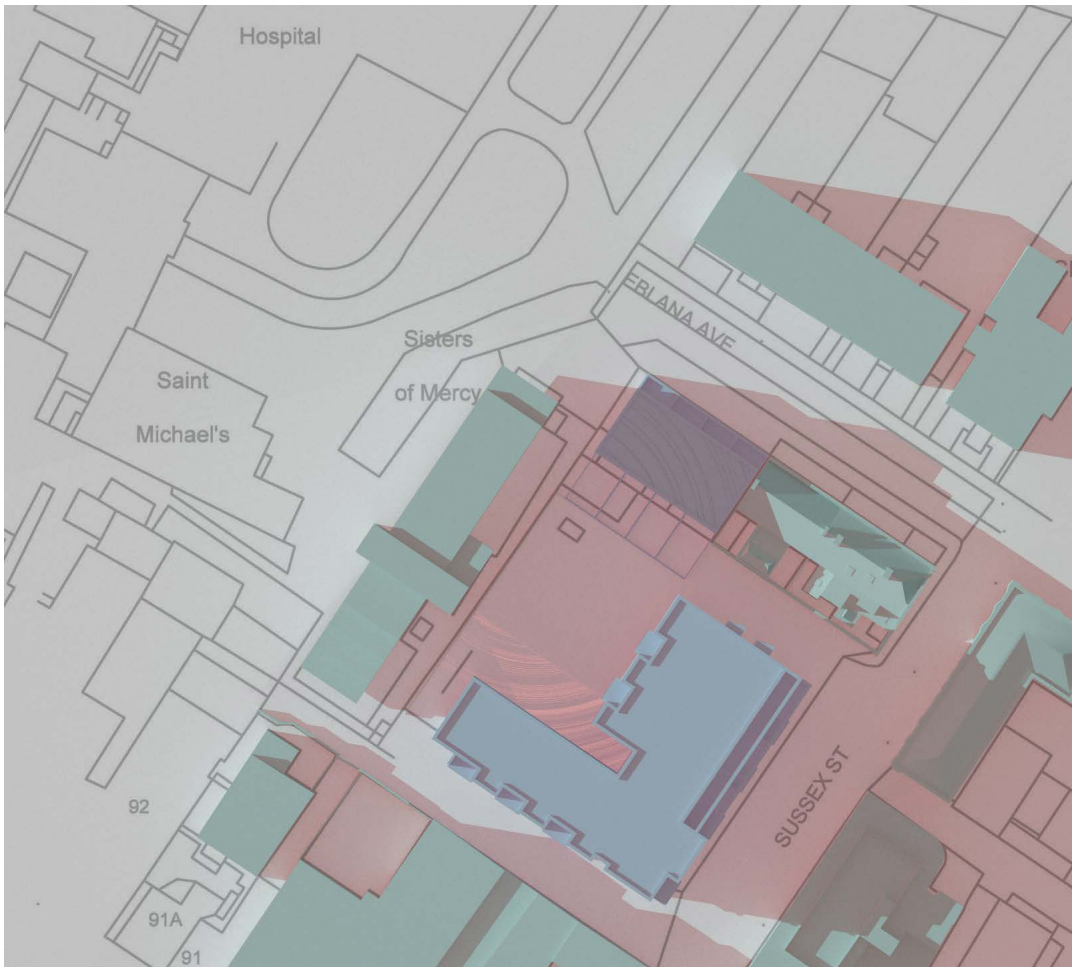
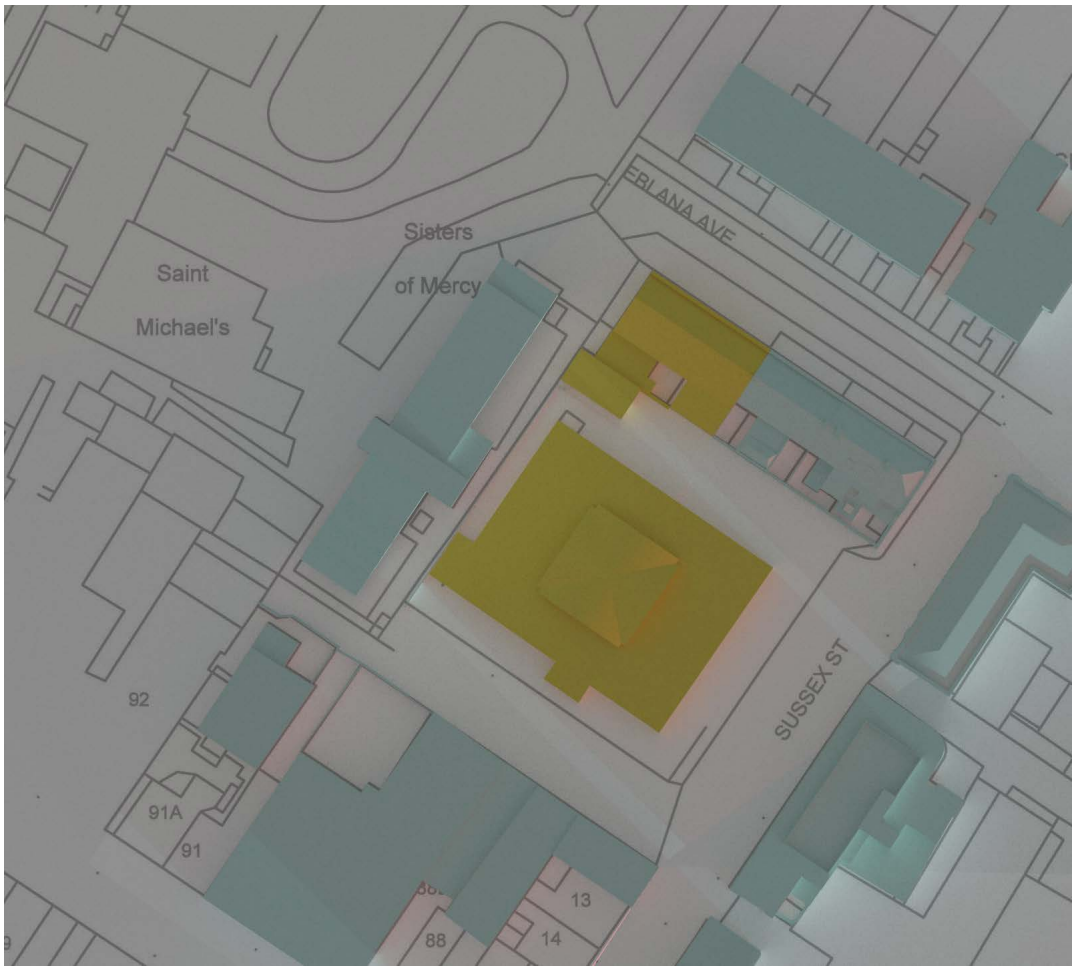


Figure 22: Shadow diagrams 21 June 19:00 UTC +1

9.4 Shadow Casting diagrams December Solstice

Existing



N

Proposed

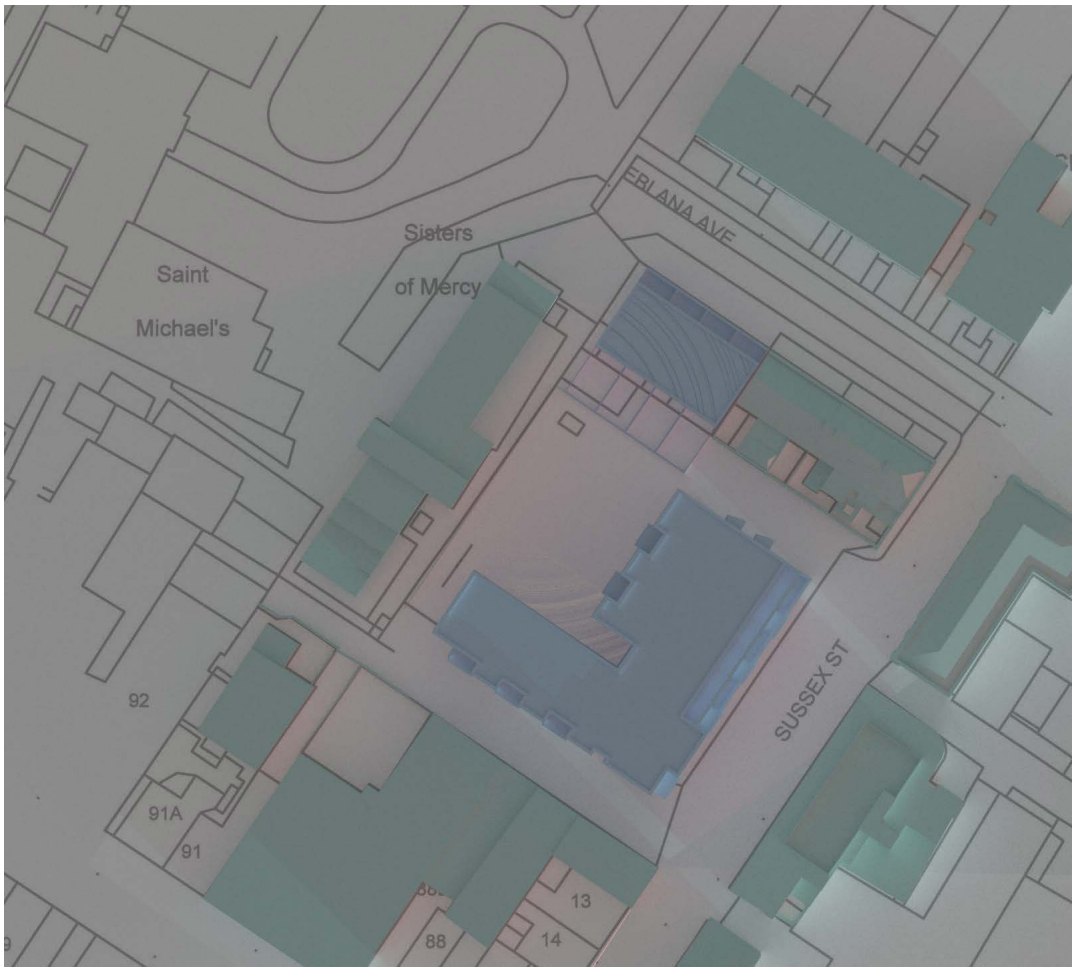
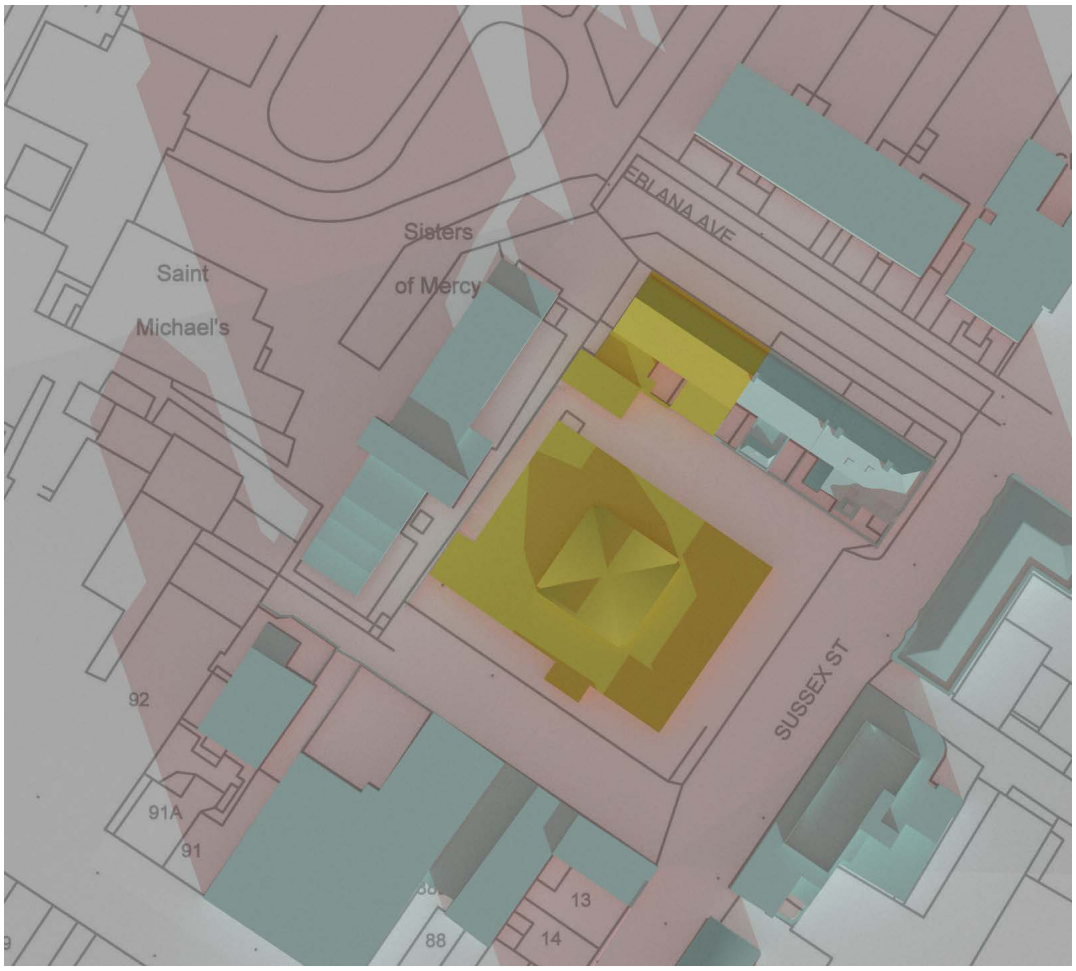


Figure 23: Shadow diagrams 21 December 09:00 UTC

Existing



N

Proposed

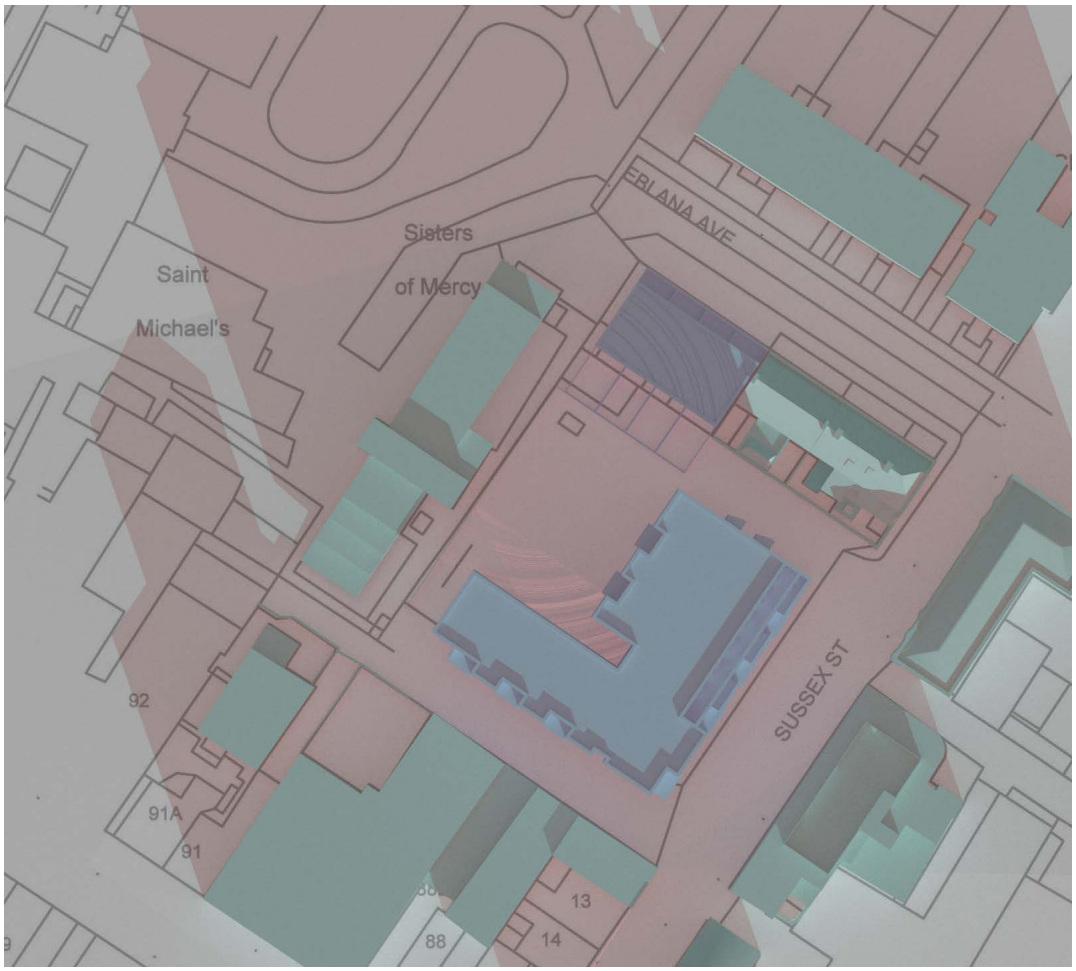
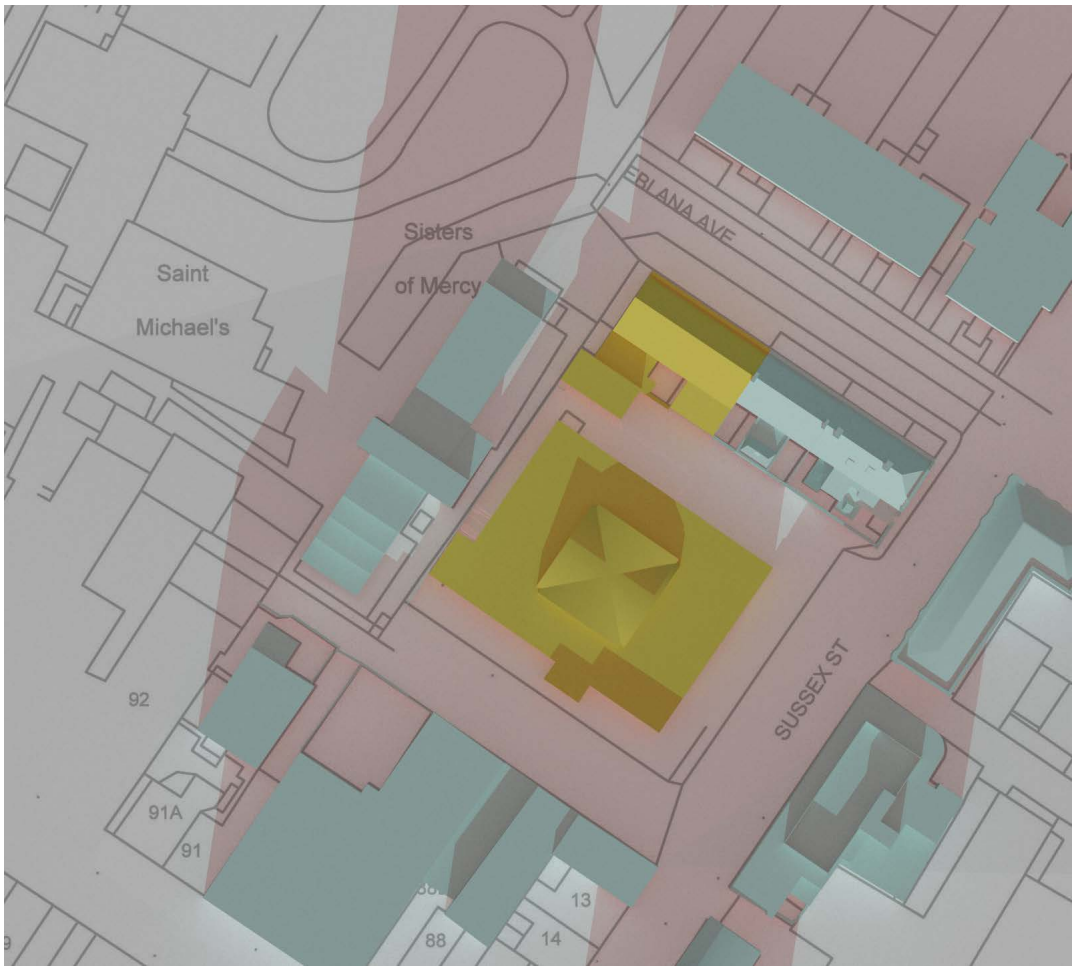


Figure 24: Shadow diagrams 21 December 11:00 UTC

Existing



N

Proposed

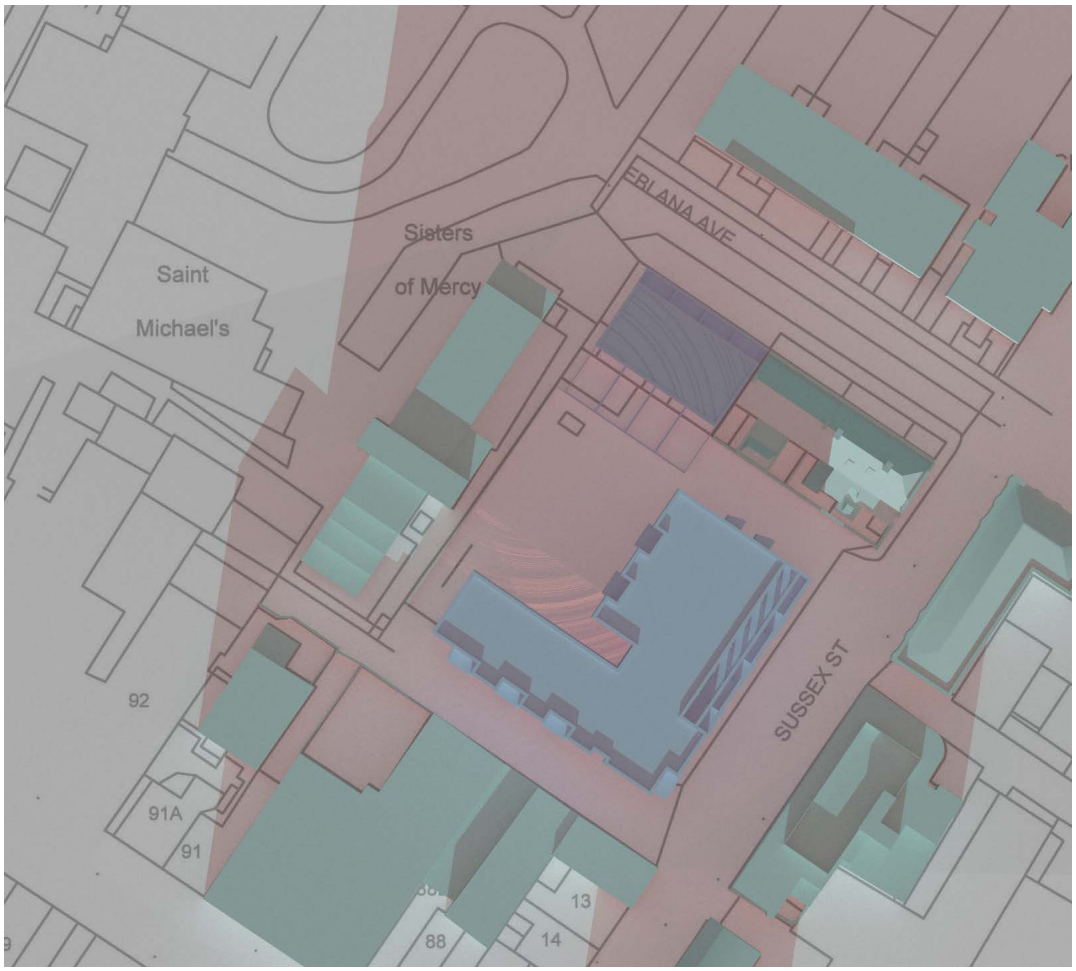
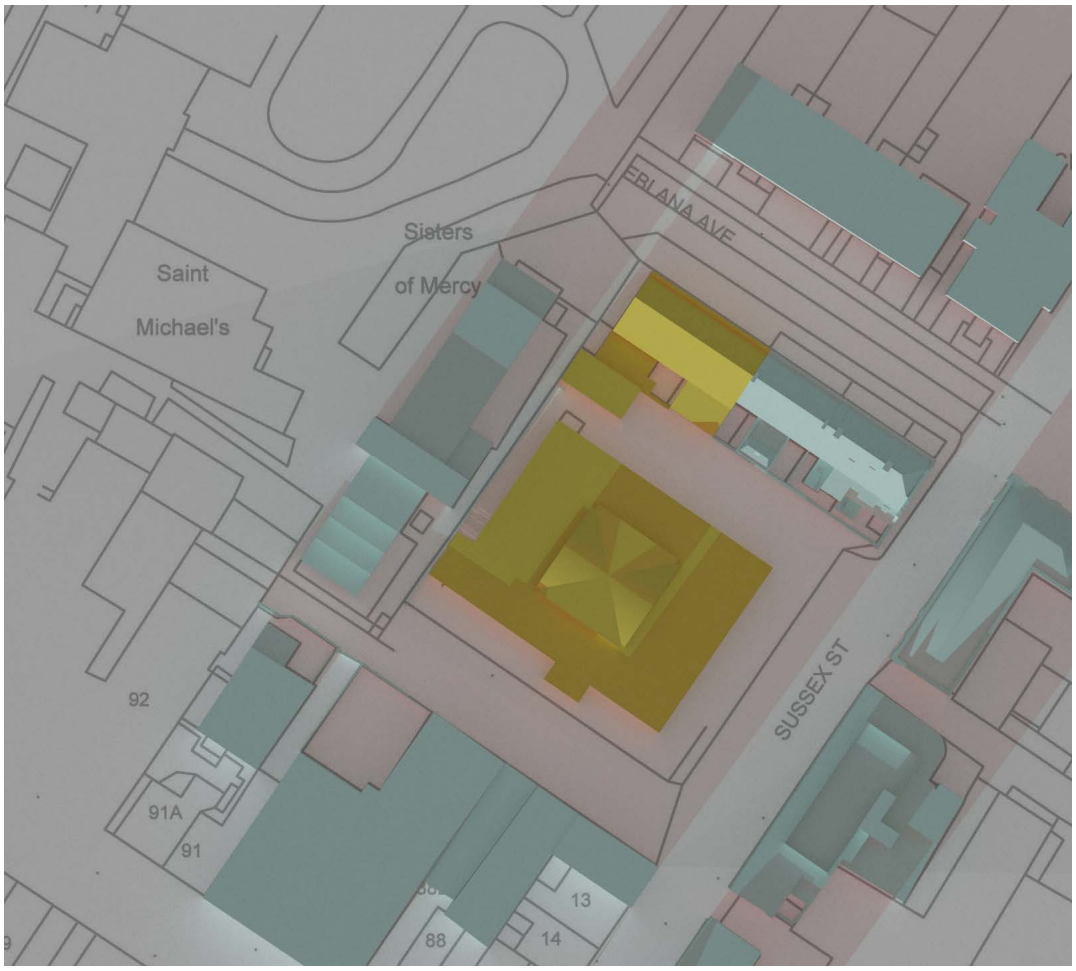


Figure 25: Shadow diagrams 21 December 13:00 UTC

Existing



N

Proposed

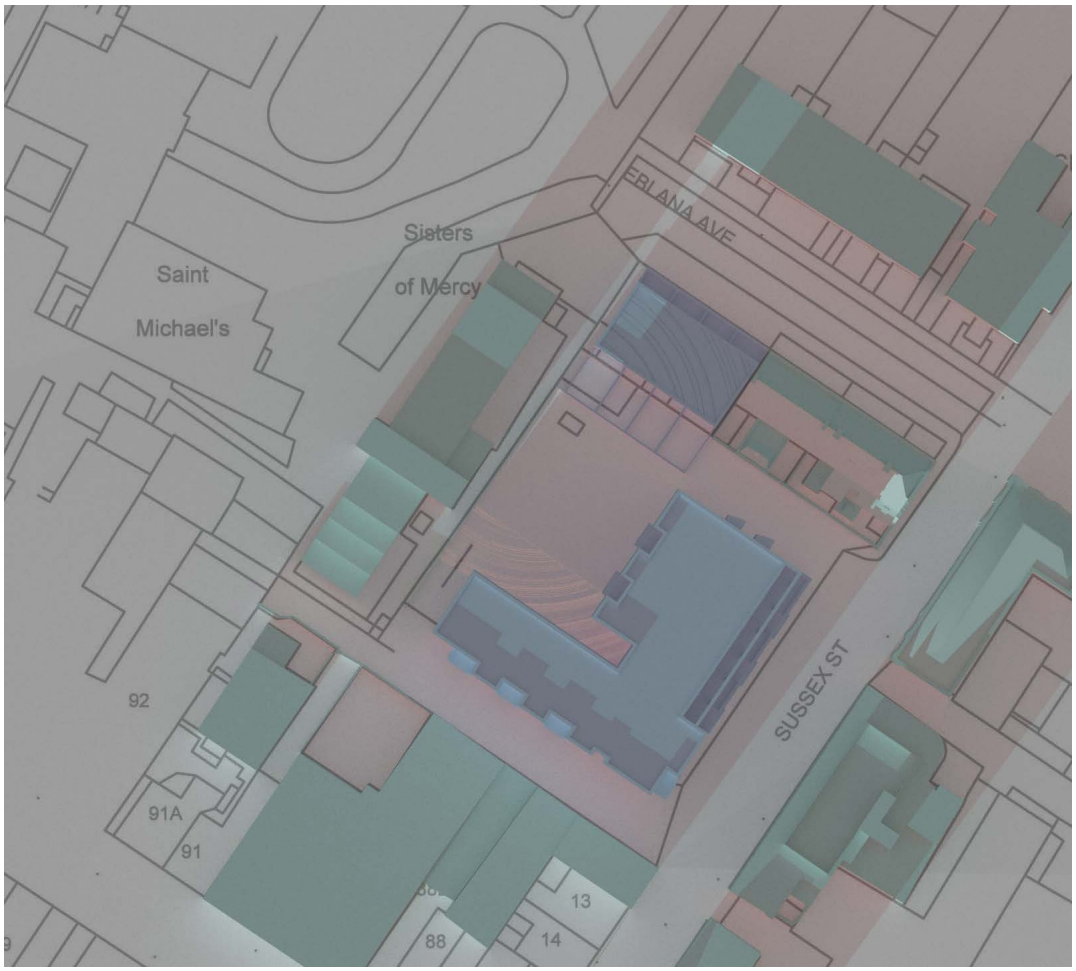


Figure 26: Shadow diagrams 21 December 15:00 UTC

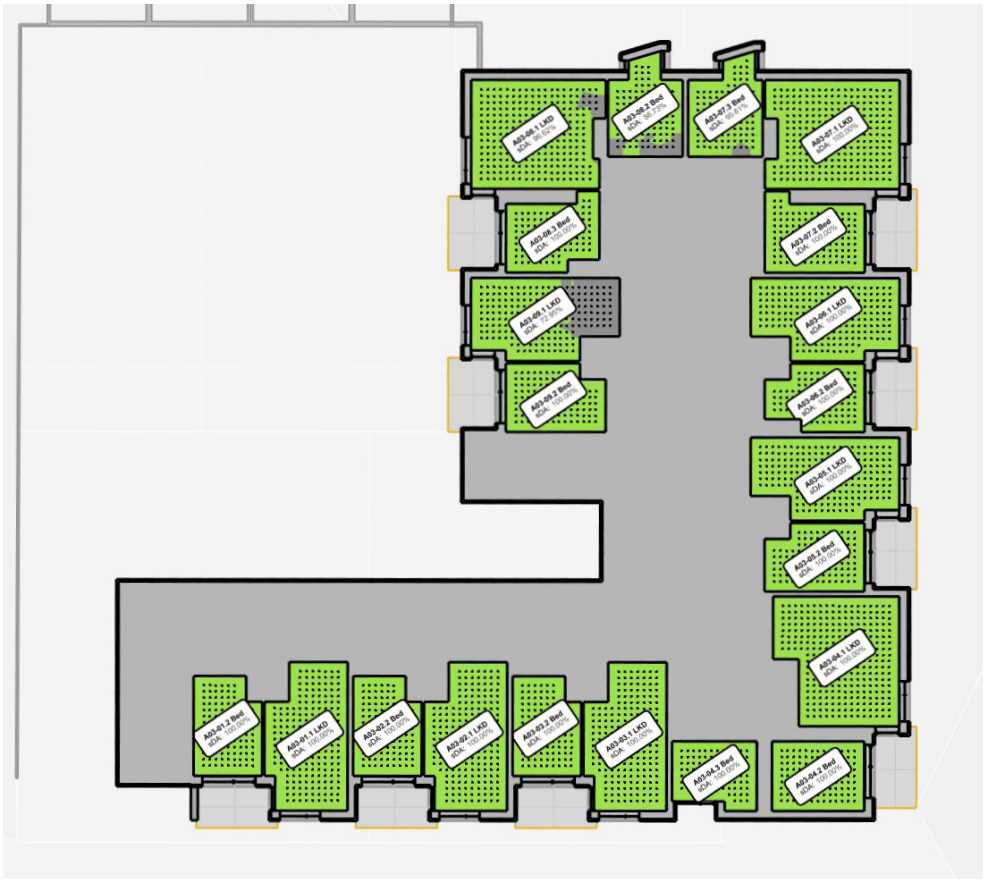
Appendix A -BS EN17037:2021+A1 Minimum room specific Daylight Provision in accordance with UK National Annex Table NA.1.

First Floor

Ground Floor

Figure 27: Plans Indicating Daylight Provision to BS EN17037:2021+A1 Table NA.1

Third Floor



Second Floor

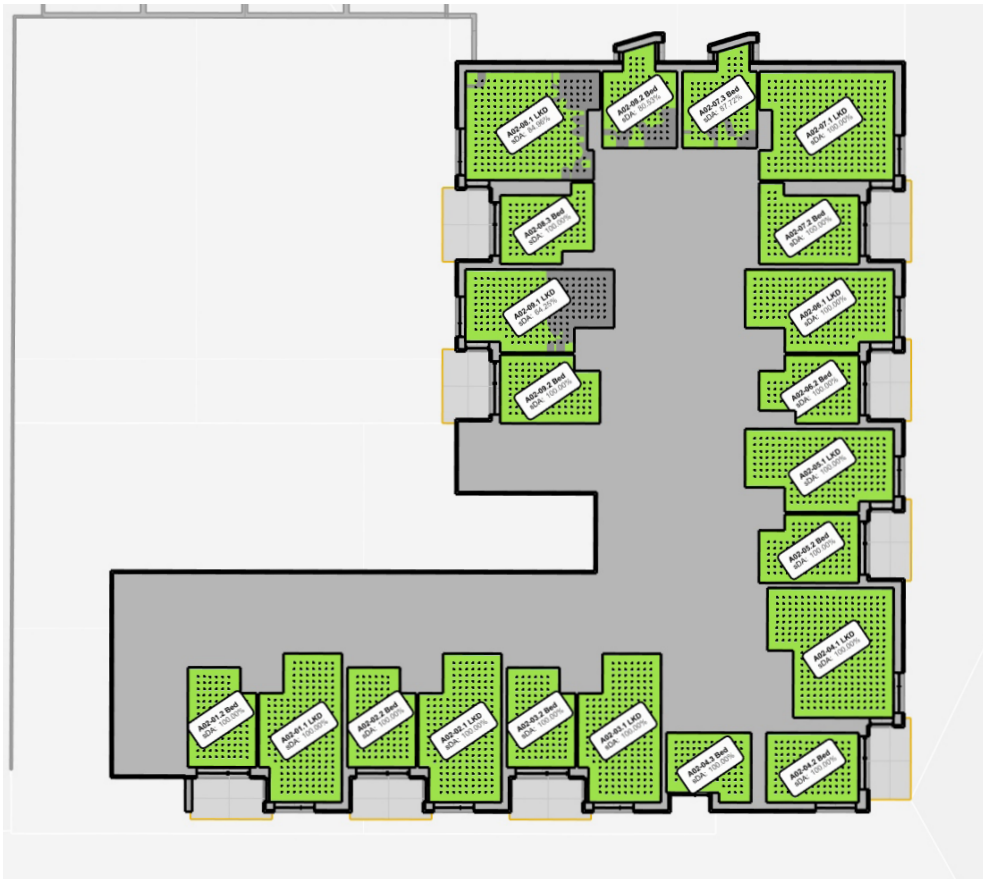


Figure 28: Plans Indicating Daylight Provision to BS EN17037:2021+A1 Table NA.1

Fifth Floor

Fourth Floor

Figure 29: Plans Indicating Daylight Provision to BS EN17037:2021+A1 Table NA.1

6th Floor

Figure 30: Plans Indicating Daylight Provision to BS EN17037:2021+A1 Table NA.1

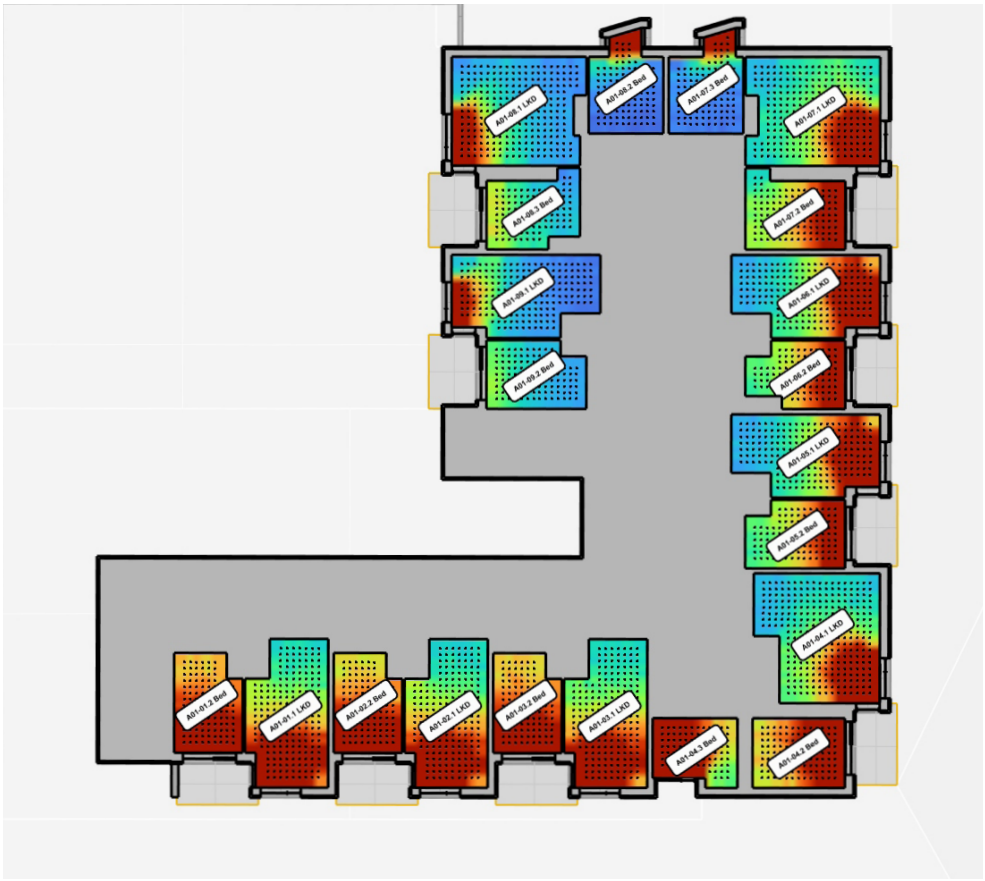
Minimum Illuminance Levels to BS EN17037:2018+A1:2021 - Table NA.1							
Space ID	Use	Area m2	Sensor Count	Target Lux	Mean Lux	% of grid target exceeded - Minimum 50% of Grid	Meets Criteria
A00-01.1	LKD	25.8	236	200	515	40.3%	N
A00-01.2	Bed	17.1	136	100	729	100.0%	Y
A00-02.1	LKD	25.8	236	200	431	32.6%	N
A00-02.2	Bed	17.1	136	100	518	82.4%	Y
A00-03.1	LKD	25.8	236	200	427	30.9%	N
A00-03.2	Bed	17.1	136	100	553	84.6%	Y
A01-01.1	LKD	23.9	207	200	1114	100.0%	Y
A01-01.2	Bed	14.0	114	100	1229	100.0%	Y
A01-02.1	LKD	23.9	207	200	1086	100.0%	Y
A01-02.2	Bed	14.0	114	100	1157	100.0%	Y
A01-03.1	LKD	23.9	207	200	1060	100.0%	Y
A01-03.2	Bed	14.0	114	100	1172	100.0%	Y
A01-04.1	LKD	31.8	298	200	793	98.0%	Y
A01-04.2	Bed	14.0	117	100	1195	100.0%	Y
A01-04.3	Bed	11.7	91	100	1514	100.0%	Y
A01-05.1	LKD	23.9	207	200	924	90.8%	Y
A01-05.2	Bed	14.0	114	100	855	100.0%	Y
A01-06.1	LKD	23.9	207	200	930	95.2%	Y
A01-06.2	Bed	13.0	102	100	910	100.0%	Y
A01-07.1	LKD	30.7	269	200	816	97.4%	Y
A01-07.2	Bed	15.6	130	100	875	100.0%	Y
A01-07.3	Bed	14.1	114	100	278	66.7%	Y
A01-08.1	LKD	30.3	266	200	330	43.6%	N
A01-08.2	Bed	14.1	113	100	210	38.9%	N
A01-08.3	Bed	13.7	111	100	357	100.0%	Y
A01-09.1	LKD	23.9	207	200	322	52.7%	Y
A01-09.2	Bed	14.0	114	100	300	100.0%	Y
A02-01.1	LKD	23.9	207	200	1260	100.0%	Y
A02-01.2	Bed	14.0	114	100	1406	100.0%	Y
A02-02.1	LKD	23.9	207	200	1264	100.0%	Y
A02-02.2	Bed	14.0	114	100	1417	100.0%	Y
A02-03.1	LKD	23.9	207	200	1255	100.0%	Y
A02-03.2	Bed	14.0	114	100	1420	100.0%	Y
A02-04.1	LKD	31.8	298	200	966	100.0%	Y
A02-04.2	Bed	14.0	117	100	3191	100.0%	Y
A02-04.3	Bed	11.7	91	100	1808	100.0%	Y
A02-05.1	LKD	23.9	207	200	1103	100.0%	Y
A02-05.2	Bed	14.0	114	100	1094	100.0%	Y
A02-06.1	LKD	23.9	207	200	1107	100.0%	Y
A02-06.2	Bed	13.0	102	100	1150	100.0%	Y
A02-07.1	LKD	30.7	269	200	931	100.0%	Y
A02-07.2	Bed	15.6	130	100	1041	100.0%	Y
A02-07.3	Bed	14.1	114	100	299	82.5%	Y
A02-08.1	LKD	30.3	266	200	374	58.6%	Y
A02-08.2	Bed	14.1	113	100	231	61.9%	Y
A02-08.3	Bed	13.7	111	100	419	100.0%	Y
A02-09.1	LKD	23.9	207	200	369	63.3%	Y
A02-09.2	Bed	14.0	114	100	352	100.0%	Y
A03-01.1	LKD	23.9	207	200	1315	100.0%	Y
A03-01.2	Bed	14.0	114	100	1471	100.0%	Y
A03-02.1	LKD	23.9	207	200	1326	100.0%	Y

Minimum Illuminance Levels to BS EN17037:2018+A1:2021 - Table NA.1							
Space ID	Use	Area m2	Sensor Count	Target Lux	Mean Lux	% of grid target exceeded - Minimum 50% of Grid	Meets Criteria
A03-02.2	Bed	14.0	114	100	1501	100.0%	Y
A03-03.1	LKD	23.9	207	200	1338	100.0%	Y
A03-03.2	Bed	14.0	114	100	1505	100.0%	Y
A03-04.1	LKD	31.8	298	200	1037	100.0%	Y
A03-04.2	Bed	14.0	117	100	1621	100.0%	Y
A03-04.3	Bed	11.7	91	100	1897	100.0%	Y
A03-05.1	LKD	23.9	207	200	1191	100.0%	Y
A03-05.2	Bed	14.0	114	100	1218	100.0%	Y
A03-06.1	LKD	23.9	207	200	1196	100.0%	Y
A03-06.2	Bed	13.0	102	100	1273	100.0%	Y
A03-07.1	LKD	30.7	269	200	989	100.0%	Y
A03-07.2	Bed	15.6	130	100	1136	100.0%	Y
A03-07.3	Bed	14.1	114	100	318	88.6%	Y
A03-08.1	LKD	30.3	266	200	421	81.6%	Y
A03-08.2	Bed	14.1	113	100	246	70.8%	Y
A03-08.3	Bed	13.7	111	100	483	100.0%	Y
A03-09.1	LKD	23.9	207	200	428	72.9%	Y
A03-09.2	Bed	14.0	114	100	417	100.0%	Y
A04-01.1	LKD	23.9	207	200	1340	100.0%	Y
A04-01.2	Bed	14.0	114	100	1489	100.0%	Y
A04-02.1	LKD	23.9	207	200	1355	100.0%	Y
A04-02.2	Bed	14.0	114	100	1512	100.0%	Y
A04-03.1	LKD	23.9	207	200	1361	100.0%	Y
A04-03.2	Bed	14.0	114	100	1513	100.0%	Y
A04-04.1	LKD	31.8	298	200	1058	100.0%	Y
A04-04.2	Bed	14.0	117	100	3493	100.0%	Y
A04-04.3	Bed	11.7	91	100	1946	100.0%	Y
A04-05.1	LKD	23.9	207	200	1244	100.0%	Y
A04-05.2	Bed	14.0	114	100	1428	100.0%	Y
A04-06.1	LKD	23.9	207	200	1251	100.0%	Y
A04-06.2	Bed	13.0	102	100	1506	100.0%	Y
A04-07.1	LKD	30.7	269	200	1036	100.0%	Y
A04-07.2	Bed	15.6	130	100	1330	100.0%	Y
A04-07.3	Bed	14.1	114	100	325	95.6%	Y
A04-08.1	LKD	30.3	266	200	471	96.2%	Y
A04-08.2	Bed	14.1	113	100	251	76.1%	Y
A04-08.3	Bed	13.7	111	100	549	100.0%	Y
A04-09.1	LKD	23.9	207	200	493	83.6%	Y
A04-09.2	Bed	14.0	114	100	485	100.0%	Y
A05-01.1	LKD	23.9	207	200	1350	100.0%	Y
A05-01.2	Bed	14.0	114	100	1495	100.0%	Y
A05-02.1	LKD	23.9	207	200	1361	100.0%	Y
A05-02.2	Bed	14.0	114	100	1512	100.0%	Y
A05-03.1	LKD	23.9	207	200	1365	100.0%	Y
A05-03.2	Bed	14.0	114	100	1494	100.0%	Y
A05-04.1	LKD	31.8	298	200	1072	100.0%	Y
A05-04.2	Bed	14.0	117	100	1669	100.0%	Y
A05-04.3	Bed	11.7	91	100	1955	100.0%	Y
A05-05.1	LKD	32.3	296	200	1267	100.0%	Y
A05-05.2	Bed	13.3	108	100	1090	100.0%	Y
A05-06.1	LKD	26.4	228	200	1360	100.0%	Y

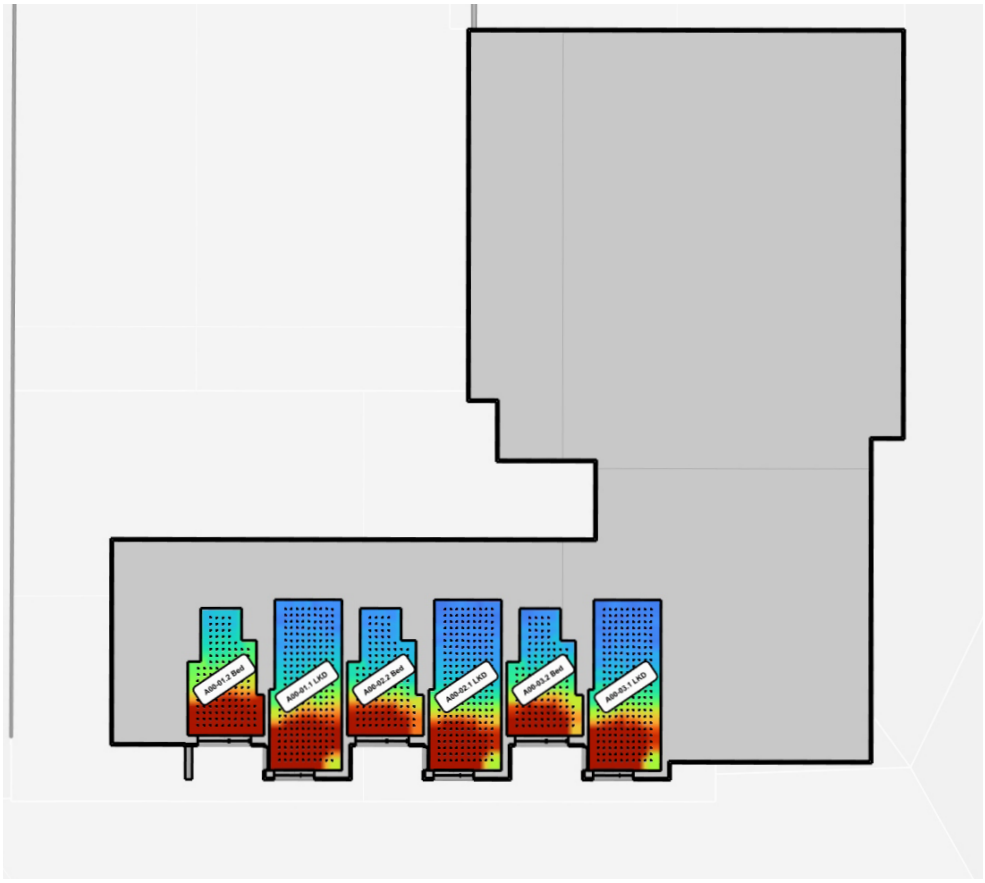
Minimum Illuminance Levels to BS EN17037:2018+A1:2021 - Table NA.1							
Space ID	Use	Area m2	Sensor Count	Target Lux	Mean Lux	% of grid target exceeded - Minimum 50% of Grid	Meets Criteria
A05-06.2	Bed	13.6	108	100	1099	100.0%	Y
A05-07.1	LKD	30.3	266	200	526	99.6%	Y
A05-07.2	Bed	14.1	113	100	257	84.1%	Y
A05-07.3	Bed	13.7	111	100	616	100.0%	Y
A05-08.1	LKD	23.9	207	200	565	97.6%	Y
A05-08.2	Bed	14.0	114	100	564	100.0%	Y
A06-01.1	LKD	23.9	207	200	1446	100.0%	Y
A06-01.2	Bed	14.0	114	100	2327	100.0%	Y
A06-02.1	LKD	23.9	207	200	1445	100.0%	Y
A06-02.2	Bed	14.0	114	100	2298	100.0%	Y
A06-03.1	LKD	23.9	207	200	1447	100.0%	Y
A06-03.2	Bed	14.0	114	100	2288	100.0%	Y
A06-04.1	LKD	31.8	298	200	432	55.7%	Y
A06-04.2	Bed	14.0	117	100	4223	100.0%	Y
A06-04.3	Bed	11.7	91	100	1954	100.0%	Y
A06-05.1	LKD	32.3	296	200	933	100.0%	Y
A06-05.2	Bed	13.3	108	100	767	100.0%	Y
A06-06.1	LKD	26.4	228	200	1028	100.0%	Y
A06-06.2	Bed	13.6	108	100	764	100.0%	Y
A06-07.1	LKD	30.3	266	200	706	100.0%	Y
A06-07.2	Bed	14.1	113	100	290	91.2%	Y
A06-07.3	Bed	13.7	111	100	998	100.0%	Y
A06-08.1	LKD	23.9	207	200	796	100.0%	Y
A06-08.2	Bed	14.0	114	100	958	100.0%	Y

Table 18: Minimum Daylight Provision Compliance for Habitable Rooms to BS EN17037:2018+A1:2021

Appendix B - Supplementary Information - IS/ BS EN17037:2018 Table A.1 Daylight Provision Room Results



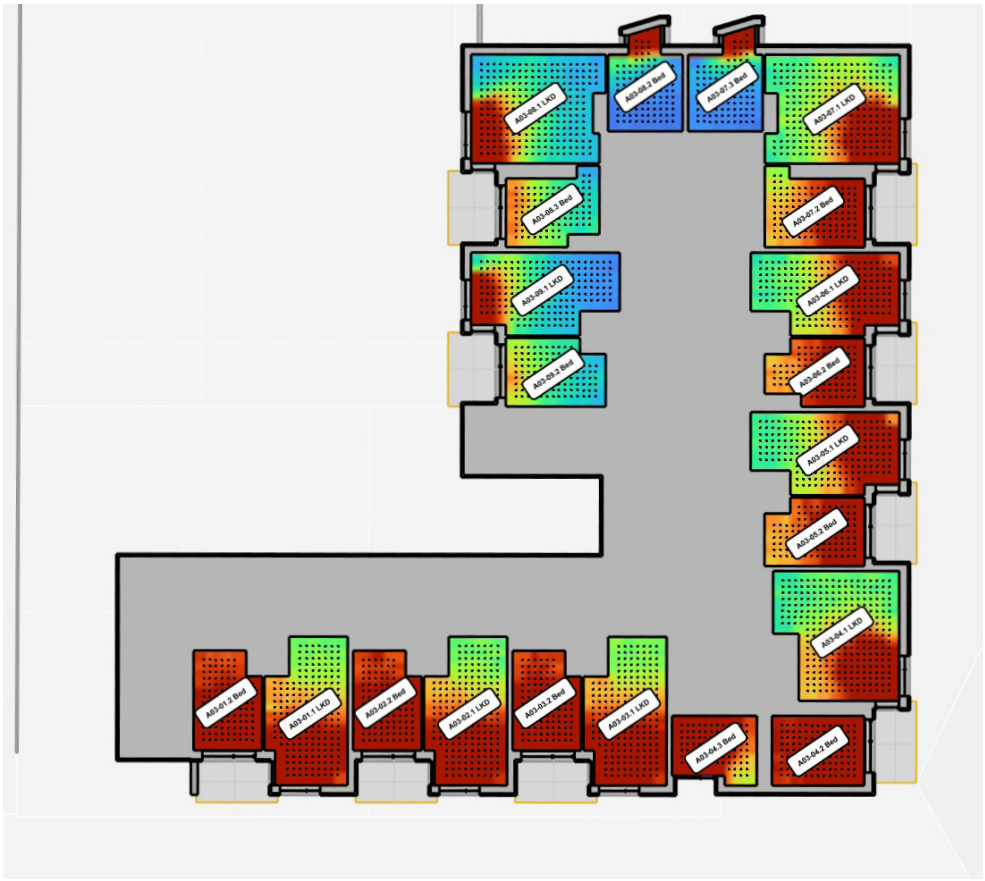
First Floor



Ground Floor

Figure 31: Ground / First Floor Daylight Provision and Annual Average Illuminance to Habitable Rooms

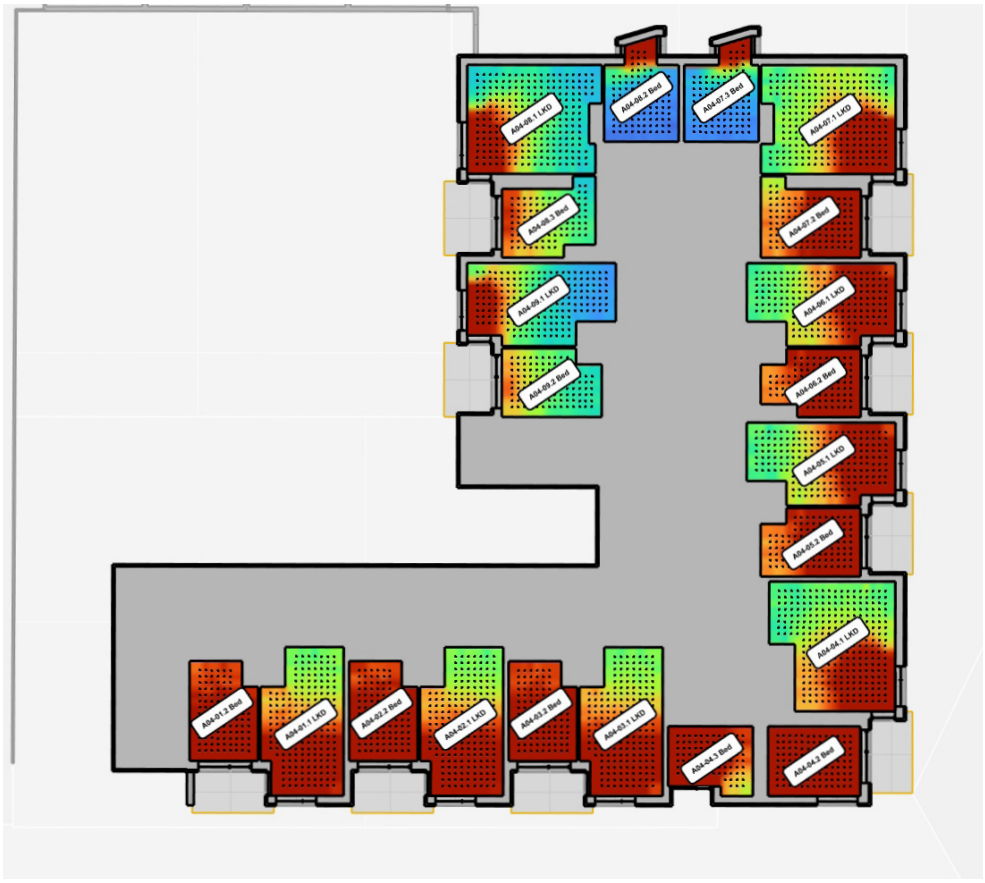
Third Floor



Second Floor

Figure 32: No.61 Second/Third Floor Daylight Provision and Annual Average Illuminance to Habitable

Fifth Floor



Fourth Floor

Figure 33: Fourth/Fifth Floor Daylight Provision and Annual Average Illuminance to Habitable Rooms

Appendix A -BS EN17037:2021+A1 Minimum room specific Daylight Provision in accordance with UK National Annex Table NA.1.

6th Floor

Figure 34: Sixth Floor Daylight Provision and Annual Average Illuminance to Habitable Rooms

EN17037:2018 Table A.1 Daylight Provision Room Schedule

Space ID	Description	Area m2	Sensor Count	Target Illuminance	300lux_50	500lux_50	750lux_50	Minimum Target Illuminance	100lux_95	300lux_95	500lux_95
A00-01.1	LKD	25.8	236	Fail	43.4%	25.7%	12.3%	Fail	44.8%	8.2%	4.2%
A00-01.2	Bed	17.1	136	Minimum	55.7%	38.6%	23.9%	Minimum	61.8%	26.7%	10.4%
A00-02.1	LKD	25.8	236	Fail	34.7%	15.9%	7.5%	Fail	38.8%	6.6%	2.2%
A00-02.2	Bed	17.1	136	Fail	38.8%	23.3%	9.8%	Fail	48.2%	13.9%	4.6%
A00-03.1	LKD	25.8	236	Fail	37.0%	18.8%	7.4%	Fail	39.1%	6.3%	2.5%
A00-03.2	Bed	17.1	136	Fail	43.0%	26.5%	13.5%	Fail	46.8%	11.4%	5.2%
A01-01.1	LKD	23.9	207	Minimum	61.5%	46.9%	32.3%	Minimum	70.8%	36.9%	17.6%
A01-01.2	Bed	14.0	114	Medium	71.1%	57.8%	45.1%	Medium	82.6%	60.9%	44.2%
A01-02.1	LKD	23.9	207	Minimum	60.8%	45.6%	31.4%	Minimum	67.5%	32.6%	15.1%
A01-02.2	Bed	14.0	114	Medium	69.1%	55.8%	42.5%	Medium	81.7%	57.8%	40.6%
A01-03.1	LKD	23.9	207	Minimum	60.3%	44.9%	29.9%	Minimum	68.8%	34.0%	15.7%
A01-03.2	Bed	14.0	114	Medium	69.1%	56.1%	42.6%	Medium	82.1%	59.7%	42.7%
A01-04.1	LKD	31.8	298	Minimum	51.2%	32.5%	12.7%	Minimum	63.2%	24.1%	6.9%
A01-04.2	Bed	14.0	117	Medium	69.7%	57.4%	46.0%	Medium	82.1%	60.8%	46.5%
A01-04.3	Bed	11.7	91	Medium	71.9%	58.9%	46.2%	Minimum	75.7%	48.9%	31.9%
A01-05.1	LKD	23.9	207	Minimum	54.6%	37.0%	17.3%	Minimum	59.9%	20.0%	6.6%
A01-05.2	Bed	14.0	114	Minimum	61.3%	46.7%	29.7%	Minimum	76.6%	47.1%	23.1%
A01-06.1	LKD	23.9	207	Minimum	54.7%	37.4%	20.7%	Minimum	60.0%	20.3%	7.1%
A01-06.2	Bed	13.0	102	Medium	64.6%	50.5%	34.0%	Minimum	77.2%	47.6%	24.4%
A01-07.1	LKD	30.7	269	Fail	49.4%	29.7%	15.3%	Minimum	64.9%	27.6%	8.8%
A01-07.2	Bed	15.6	130	Minimum	62.8%	47.0%	29.4%	Minimum	77.3%	45.9%	24.0%
A01-07.3	Bed	14.1	114	Fail	6.6%	3.8%	2.1%	Fail	30.4%	3.4%	1.0%
A01-08.1	LKD	30.3	266	Fail	34.6%	8.1%	1.7%	Minimum	57.1%	6.7%	0.5%
A01-08.2	Bed	14.1	113	Fail	3.8%	2.3%	1.3%	Fail	21.6%	1.8%	0.0%
A01-08.3	Bed	13.7	111	Fail	46.0%	22.6%	5.3%	Minimum	64.3%	20.5%	1.5%
A01-09.1	LKD	23.9	207	Fail	28.0%	4.3%	0.0%	Fail	42.6%	0.3%	0.0%
A01-09.2	Bed	14.0	114	Fail	36.4%	9.5%	2.5%	Minimum	63.0%	15.2%	0.9%
A02-01.1	LKD	23.9	207	Medium	67.0%	53.8%	40.1%	Medium	78.0%	50.0%	30.5%
A02-01.2	Bed	14.0	114	High	75.1%	63.2%	51.0%	High	85.2%	67.8%	52.8%
A02-02.1	LKD	23.9	207	Medium	67.2%	54.2%	40.4%	Minimum	77.6%	49.8%	30.5%
A02-02.2	Bed	14.0	114	High	74.9%	63.1%	51.0%	High	85.3%	67.8%	53.5%
A02-03.1	LKD	23.9	207	Medium	67.0%	53.9%	39.7%	Minimum	77.7%	49.9%	30.6%
A02-03.2	Bed	14.0	114	High	75.0%	63.4%	51.2%	High	85.3%	68.4%	54.2%
A02-04.1	LKD	31.8	298	Minimum	60.3%	45.7%	26.0%	Minimum	73.4%	43.1%	16.3%
A02-04.2	Bed	14.0	117	High	85.0%	79.9%	73.3%	High	89.8%	80.4%	71.2%
A02-04.3	Bed	11.7	91	High	77.6%	66.4%	55.9%	Medium	82.0%	59.4%	43.9%
A02-05.1	LKD	23.9	207	Minimum	62.4%	47.5%	29.4%	Minimum	69.9%	33.9%	14.0%
A02-05.2	Bed	14.0	114	Medium	69.9%	56.3%	42.4%	Medium	81.8%	58.9%	40.5%
A02-06.1	LKD	23.9	207	Minimum	62.6%	47.8%	30.5%	Minimum	71.7%	37.4%	16.5%
A02-06.2	Bed	13.0	102	Medium	71.9%	58.0%	44.6%	Medium	82.1%	59.7%	41.6%
A02-07.1	LKD	30.7	269	Minimum	54.7%	37.9%	20.5%	Minimum	74.1%	40.8%	17.8%
A02-07.2	Bed	15.6	130	Medium	69.0%	53.9%	38.0%	Medium	81.1%	56.3%	37.2%
A02-07.3	Bed	14.1	114	Fail	8.7%	4.2%	2.4%	Fail	37.4%	3.9%	1.1%
A02-08.1	LKD	30.3	266	Fail	40.7%	13.6%	2.6%	Minimum	61.7%	12.7%	1.2%
A02-08.2	Bed	14.1	113	Fail	4.5%	2.6%	1.1%	Fail	31.6%	2.3%	0.4%
A02-08.3	Bed	13.7	111	Minimum	51.6%	29.3%	8.2%	Minimum	69.4%	28.2%	4.1%
A02-09.1	LKD	23.9	207	Fail	36.7%	8.1%	0.5%	Fail	49.6%	2.0%	0.0%
A02-09.2	Bed	14.0	114	Fail	45.4%	18.0%	4.0%	Minimum	68.5%	23.0%	2.7%
A03-01.1	LKD	23.9	207	Medium	69.3%	56.1%	42.9%	Medium	79.2%	53.4%	33.7%
A03-01.2	Bed	14.0	114	High	76.0%	64.5%	53.1%	High	86.1%	69.9%	56.3%

EN17037:2018 Table A.1 Daylight Provision Room Schedule

Space ID	Description	Area m2	Sensor Count	Target Illuminance	300lux_50	500lux_50	750lux_50	Minimum Target Illuminance	100lux_95	300lux_95	500lux_95
A03-02.1	LKD	23.9	207	Medium	70.1%	56.9%	44.6%	Medium	78.7%	52.4%	33.0%
A03-02.2	Bed	14.0	114	High	76.4%	65.2%	54.4%	High	86.0%	69.9%	56.4%
A03-03.1	LKD	23.9	207	Medium	70.1%	57.1%	44.7%	Medium	79.2%	53.3%	33.7%
A03-03.2	Bed	14.0	114	High	76.5%	65.5%	54.7%	High	86.1%	70.2%	56.9%
A03-04.1	LKD	31.8	298	Minimum	63.8%	49.3%	32.6%	Minimum	76.5%	47.4%	25.4%
A03-04.2	Bed	14.0	117	High	78.0%	67.5%	56.7%	High	86.9%	73.7%	60.8%
A03-04.3	Bed	11.7	91	High	79.1%	68.8%	58.4%	Medium	82.4%	61.1%	46.5%
A03-05.1	LKD	23.9	207	Medium	66.3%	52.0%	35.6%	Minimum	76.8%	46.7%	23.7%
A03-05.2	Bed	14.0	114	Medium	74.3%	61.3%	48.5%	High	84.7%	66.9%	51.4%
A03-06.1	LKD	23.9	207	Medium	66.2%	51.5%	35.5%	Minimum	77.1%	46.7%	24.5%
A03-06.2	Bed	13.0	102	High	75.3%	62.5%	50.5%	High	84.8%	67.4%	51.9%
A03-07.1	LKD	30.7	269	Minimum	58.8%	42.5%	25.6%	Minimum	76.9%	46.3%	24.7%
A03-07.2	Bed	15.6	130	Medium	71.8%	57.8%	43.6%	Medium	83.4%	62.2%	44.7%
A03-07.3	Bed	14.1	114	Fail	11.4%	4.5%	3.0%	Fail	44.7%	4.7%	1.7%
A03-08.1	LKD	30.3	266	Fail	47.9%	22.9%	4.9%	Minimum	68.4%	24.6%	2.6%
A03-08.2	Bed	14.1	113	Fail	5.8%	3.0%	1.5%	Fail	39.7%	2.9%	0.9%
A03-08.3	Bed	13.7	111	Minimum	58.5%	40.4%	15.0%	Minimum	74.1%	38.3%	7.6%
A03-09.1	LKD	23.9	207	Fail	44.4%	16.0%	2.3%	Minimum	55.8%	4.7%	0.4%
A03-09.2	Bed	14.0	114	Minimum	54.3%	31.4%	6.8%	Minimum	73.2%	33.8%	4.9%
A04-01.1	LKD	23.9	207	Medium	70.3%	57.2%	45.0%	Medium	79.2%	53.2%	33.9%
A04-01.2	Bed	14.0	114	High	76.6%	65.4%	54.6%	High	86.1%	69.9%	56.4%
A04-02.1	LKD	23.9	207	Medium	70.1%	57.1%	44.7%	Medium	79.3%	53.5%	34.1%
A04-02.2	Bed	14.0	114	High	76.4%	65.4%	54.4%	High	86.2%	70.3%	56.9%
A04-03.1	LKD	23.9	207	Medium	71.3%	57.8%	46.0%	Medium	79.2%	53.8%	34.5%
A04-03.2	Bed	14.0	114	High	76.5%	65.5%	54.8%	High	86.1%	70.2%	56.6%
A04-04.1	LKD	31.8	298	Minimum	63.8%	49.5%	33.2%	Minimum	77.1%	48.2%	27.8%
A04-04.2	Bed	14.0	117	High	86.1%	81.5%	75.7%	High	91.3%	82.3%	75.5%
A04-04.3	Bed	11.7	91	High	79.3%	69.2%	59.2%	Medium	82.9%	62.3%	47.6%
A04-05.1	LKD	23.9	207	Medium	67.8%	54.1%	38.5%	Minimum	77.8%	48.8%	26.5%
A04-05.2	Bed	14.0	114	High	76.7%	64.4%	52.6%	High	85.3%	68.7%	53.6%
A04-06.1	LKD	23.9	207	Medium	67.6%	53.4%	38.6%	Minimum	77.8%	48.6%	26.9%
A04-06.2	Bed	13.0	102	High	77.7%	66.5%	54.0%	High	85.1%	68.5%	53.7%
A04-07.1	LKD	30.7	269	Minimum	60.7%	44.3%	28.0%	Minimum	77.6%	48.4%	28.2%
A04-07.2	Bed	15.6	130	Medium	74.9%	61.8%	48.9%	Medium	84.4%	65.5%	49.1%
A04-07.3	Bed	14.1	114	Fail	13.9%	4.7%	3.1%	Fail	46.4%	4.7%	2.1%
A04-08.1	LKD	30.3	266	Minimum	53.7%	31.6%	8.0%	Minimum	71.9%	32.5%	4.4%
A04-08.2	Bed	14.1	113	Fail	6.3%	3.1%	1.6%	Fail	42.4%	3.0%	1.3%
A04-08.3	Bed	13.7	111	Minimum	65.7%	49.1%	29.4%	Minimum	78.6%	48.1%	19.0%
A04-09.1	LKD	23.9	207	Minimum	52.1%	27.5%	5.1%	Minimum	61.2%	9.8%	1.4%
A04-09.2	Bed	14.0	114	Minimum	60.0%	41.1%	14.0%	Minimum	78.4%	46.7%	16.3%
A05-01.1	LKD	23.9	207	Medium	69.7%	56.8%	43.7%	Medium	78.5%	52.2%	32.4%
A05-01.2	Bed	14.0	114	High	76.4%	65.3%	54.4%	High	85.9%	69.5%	56.3%
A05-02.1	LKD	23.9	207	Medium	70.5%	57.3%	45.3%	Medium	79.2%	53.3%	33.2%
A05-02.2	Bed	14.0	114	High	76.3%	65.1%	53.9%	High	85.9%	69.5%	56.2%
A05-03.1	LKD	23.9	207	Medium	71.1%	57.6%	45.6%	Medium	79.3%	53.6%	33.5%
A05-03.2	Bed	14.0	114	High	76.3%	65.3%	54.0%	High	85.8%	69.1%	56.0%
A05-04.1	LKD	31.8	298	Minimum	63.9%	49.2%	33.8%	Minimum	76.8%	47.6%	26.6%
A05-04.2	Bed	14.0	117	High	78.7%	68.5%	57.5%	High	87.0%	73.8%	60.4%
A05-04.3	Bed	11.7	91	High	79.8%	70.3%	59.9%	Medium	83.0%	63.0%	48.7%
A05-05.1	LKD	32.3	296	Fail	49.5%	26.8%	14.3%	Minimum	74.5%	37.8%	15.7%

EN17037:2018 Table A.1 Daylight Provision Room Schedule											
Space ID	Description	Area m2	Sensor Count	Target Illuminance	300lux_50	500lux_50	750lux_50	Minimum Target Illuminance	100lux_95	300lux_95	500lux_95
A05-05.2	Bed	13.3	108	Fail	39.1%	18.3%	7.8%	Minimum	67.6%	25.8%	8.2%
A05-06.1	LKD	26.4	228	Minimum	63.0%	45.0%	25.0%	Medium	79.9%	52.8%	27.9%
A05-06.2	Bed	13.6	108	Fail	40.2%	18.4%	7.7%	Minimum	64.9%	23.4%	7.0%
A05-07.1	LKD	30.3	266	Minimum	58.0%	38.8%	14.3%	Minimum	76.1%	41.8%	8.6%
A05-07.2	Bed	14.1	113	Fail	6.4%	3.1%	1.7%	Fail	42.5%	3.0%	1.0%
A05-07.3	Bed	13.7	111	Medium	68.9%	53.5%	35.2%	Medium	81.6%	56.0%	34.0%
A05-08.1	LKD	23.9	207	Minimum	57.8%	37.9%	11.3%	Minimum	70.0%	25.6%	2.7%
A05-08.2	Bed	14.0	114	Minimum	66.1%	49.1%	27.8%	Medium	81.3%	55.0%	30.8%
A06-01.1	LKD	23.9	207	Medium	72.5%	59.2%	46.8%	Medium	79.5%	54.1%	34.9%
A06-01.2	Bed	14.0	114	High	81.0%	72.8%	62.1%	High	87.4%	74.2%	61.8%
A06-02.1	LKD	23.9	207	Medium	72.8%	59.4%	46.9%	Medium	79.3%	53.7%	34.0%
A06-02.2	Bed	14.0	114	High	80.6%	72.2%	61.8%	High	87.2%	73.8%	60.9%
A06-03.1	LKD	23.9	207	Medium	71.3%	58.0%	45.7%	Medium	79.3%	53.8%	34.8%
A06-03.2	Bed	14.0	114	High	80.7%	72.4%	61.9%	High	87.4%	74.2%	61.8%
A06-04.1	LKD	31.8	298	Medium	65.8%	51.7%	38.5%	Medium	77.7%	50.4%	32.5%
A06-04.2	Bed	14.0	117	High	87.4%	83.0%	77.8%	High	91.7%	82.9%	76.8%
A06-04.3	Bed	11.7	91	High	79.4%	69.6%	59.4%	Medium	83.3%	63.5%	49.4%
A06-05.1	LKD	32.3	296	Medium	69.7%	55.4%	40.8%	Medium	84.1%	63.5%	46.6%
A06-05.2	Bed	13.3	108	Minimum	63.7%	48.9%	32.6%	Medium	81.2%	56.0%	38.6%
A06-06.1	LKD	26.4	228	Medium	72.6%	59.0%	45.6%	Medium	84.2%	64.6%	48.7%
A06-06.2	Bed	13.6	108	Minimum	63.7%	48.6%	31.8%	Medium	80.6%	54.8%	36.7%
A06-07.1	LKD	30.3	266	Minimum	63.8%	46.5%	26.0%	Medium	79.9%	51.1%	24.6%
A06-07.2	Bed	14.1	113	Fail	8.4%	3.6%	1.5%	Fail	40.5%	3.4%	0.6%
A06-07.3	Bed	13.7	111	High	79.1%	68.0%	54.3%	Medium	86.2%	66.4%	48.6%
A06-08.1	LKD	23.9	207	Minimum	64.5%	47.3%	26.3%	Minimum	75.9%	41.7%	8.7%
A06-08.2	Bed	14.0	114	High	77.7%	64.7%	50.7%	High	86.8%	68.1%	51.2%

Table 19: Daylight Provision individual values for all habitable rooms to EN 17037 Table A.1.

Appendix C - Sunlight Hours to Habitable Rooms within the Apartments

Sunlight Hours Apartments				
Unit ID	Room Use	Habitable room window within 90° south	No. sunlight hours on 21st March	EN17037:2018 Level of exposure to sunlight
A00-01.1	LKD	Yes	4.9	High
A00-02.1	LKD	Yes	3.4	Medium
A00-03.1	LKD	Yes	3.4	Medium
A01-01.1	LKD	Yes	7.3	High
A01-02.1	LKD	Yes	7.1	High
A01-03.1	LKD	Yes	7.1	High
A01-04.1	LKD	Yes	4.4	High
A01-05.1	LKD	Yes	4.4	High
A01-06.1	LKD	Yes	5.2	High
A01-07.1	LKD	Yes	5.0	High
A01-08.1	LKD	No	0.1	Below criteria
A01-09.1	LKD	No	0.0	Below criteria
A02-01.1	LKD	Yes	7.9	High
A02-02.1	LKD	Yes	7.9	High
A02-03.1	LKD	Yes	7.9	High
A02-04.1	LKD	Yes	5.7	High
A02-05.1	LKD	Yes	6.1	High
A02-06.1	LKD	Yes	6.3	High
A02-07.1	LKD	Yes	6.0	High
A02-08.1	LKD	No	0.4	Below criteria
A02-09.1	LKD	No	0.0	Below criteria
A03-01.1	LKD	Yes	7.9	High
A03-02.1	LKD	Yes	7.9	High
A03-03.1	LKD	Yes	7.9	High
A03-04.1	LKD	Yes	6.6	High
A03-05.1	LKD	Yes	6.6	High
A03-06.1	LKD	Yes	6.6	High
A03-07.1	LKD	Yes	6.6	High
A03-08.1	LKD	No	0.7	Below criteria
A03-09.1	LKD	No	0.0	Below criteria
A04-01.1	LKD	Yes	7.9	High
A04-02.1	LKD	Yes	7.9	High
A04-03.1	LKD	Yes	7.9	High
A04-04.1	LKD	Yes	6.6	High
A04-05.1	LKD	Yes	6.6	High
A04-06.1	LKD	Yes	6.6	High
A04-07.1	LKD	Yes	6.6	High
A04-08.1	LKD	No	0.8	Below criteria
A04-09.1	LKD	No	0.2	Below criteria
A05-01.1	LKD	Yes	7.9	High
A05-02.1	LKD	Yes	7.9	High
A05-03.1	LKD	Yes	7.9	High
A05-04.1	LKD	Yes	6.6	High
A05-05.1	LKD	Yes	4.1	High
A05-06.1	LKD	Yes	4.6	High
A05-07.1	LKD	No	2.3	Minimum

Sunlight Hours Apartments				
Unit ID	Room Use	Habitable room window within 90° south	No. sunlight hours on 21st March	EN17037:2018 Level of exposure to sunlight
A05-08.1	LKD	No	0.2	Below criteria
A06-01.1	LKD	Yes	7.9	High
A06-02.1	LKD	Yes	7.9	High
A06-03.1	LKD	Yes	7.9	High
A06-04.1	LKD	Yes	6.3	High
A06-05.1	LKD	Yes	2.5	Minimum
A06-06.1	LKD	Yes	3.2	Medium
A06-07.1	LKD	No	2.8	Minimum
A06-08.1	LKD	No	1.8	Minimum

Table 20: Block 2 Sunlight Hours